Smithsonian

AUGUST 2000

Sculpting the Wind

[PAGE 90]

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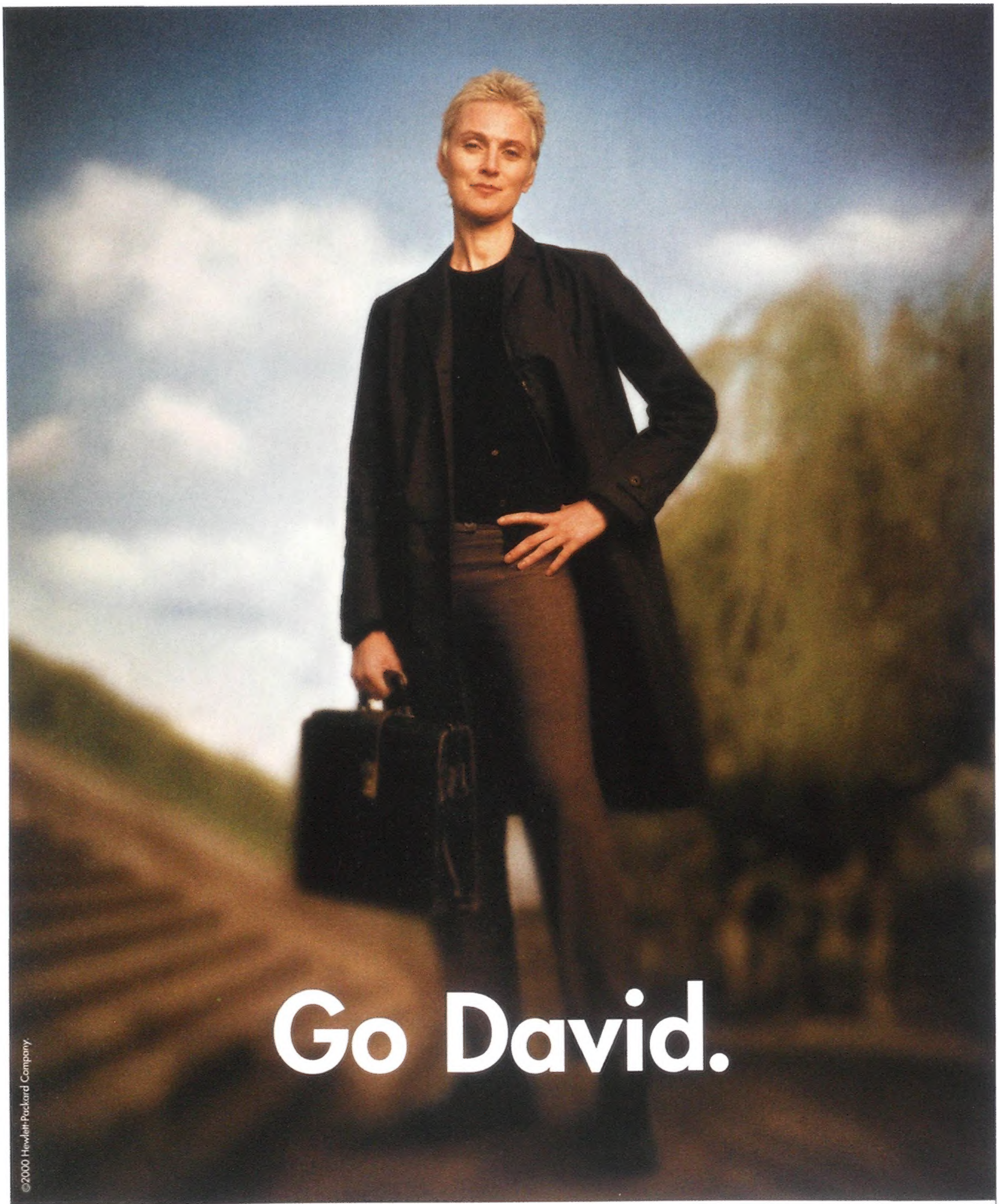

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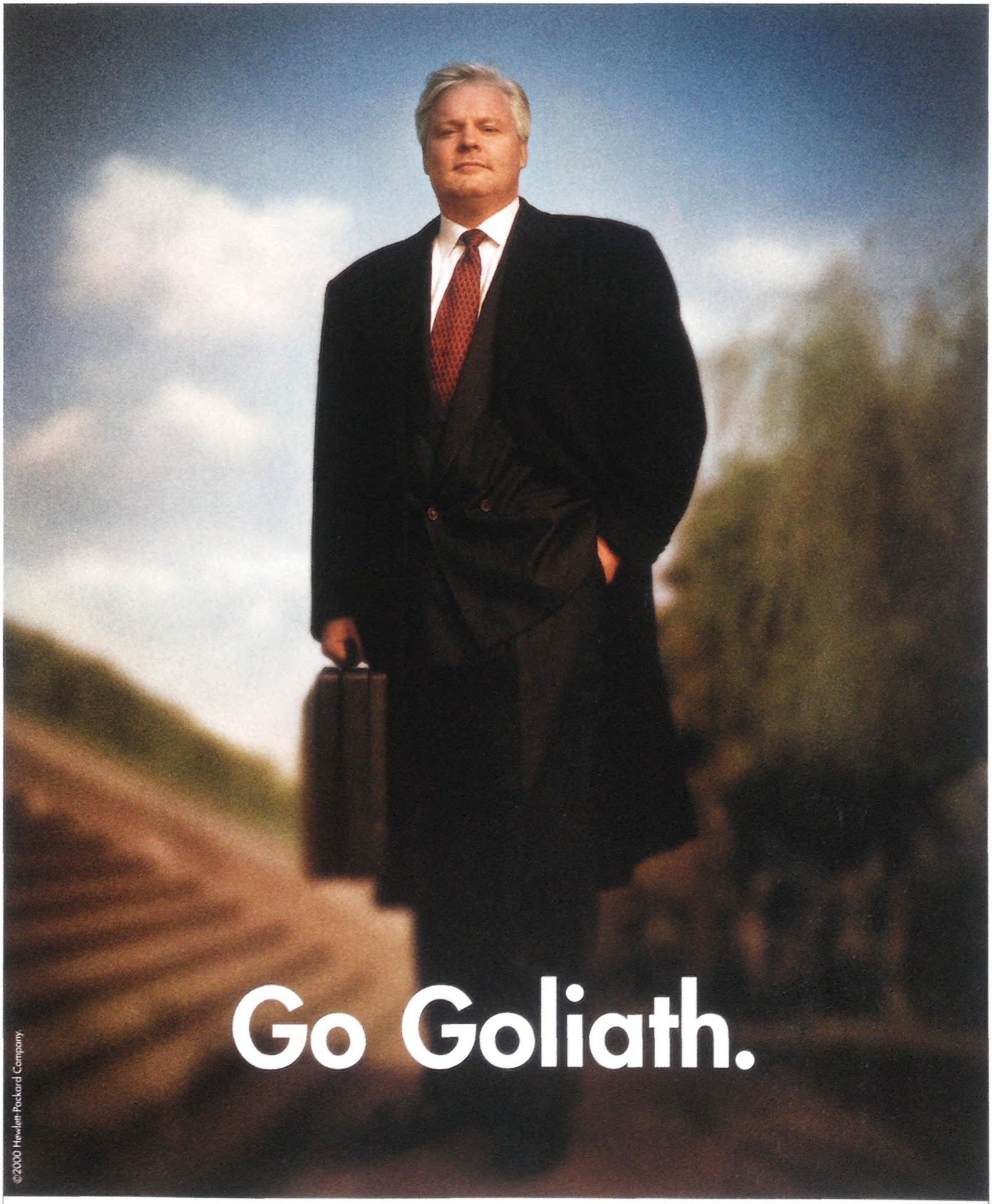

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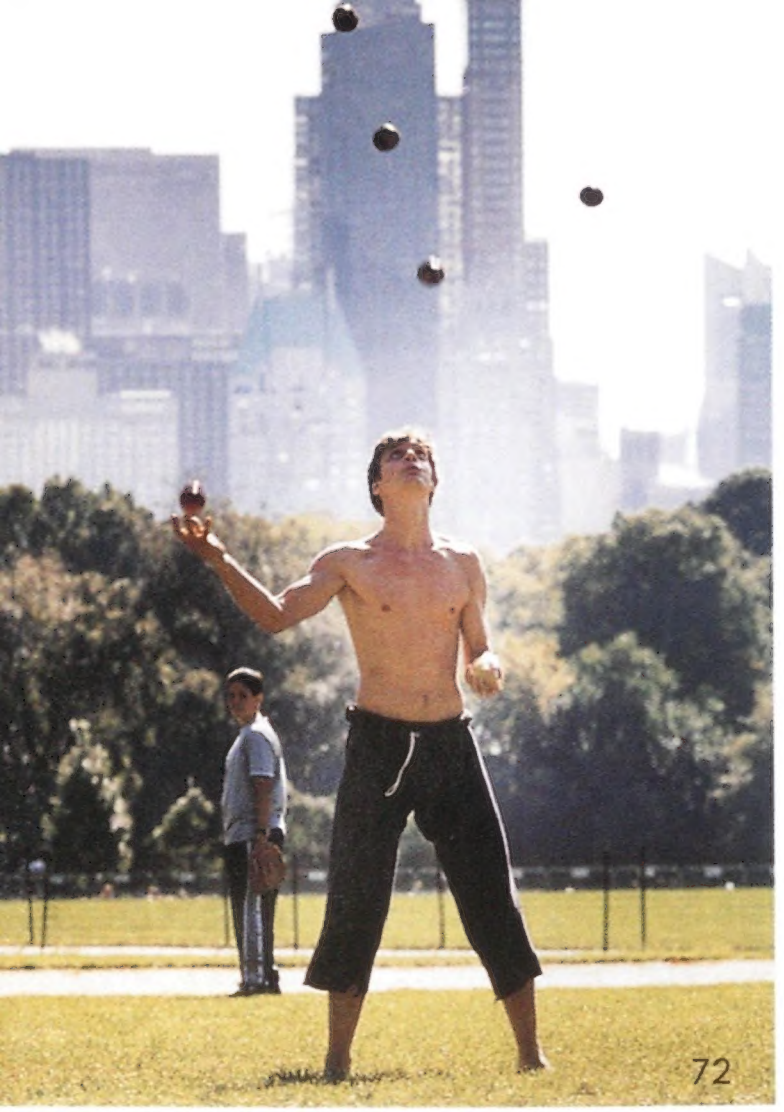

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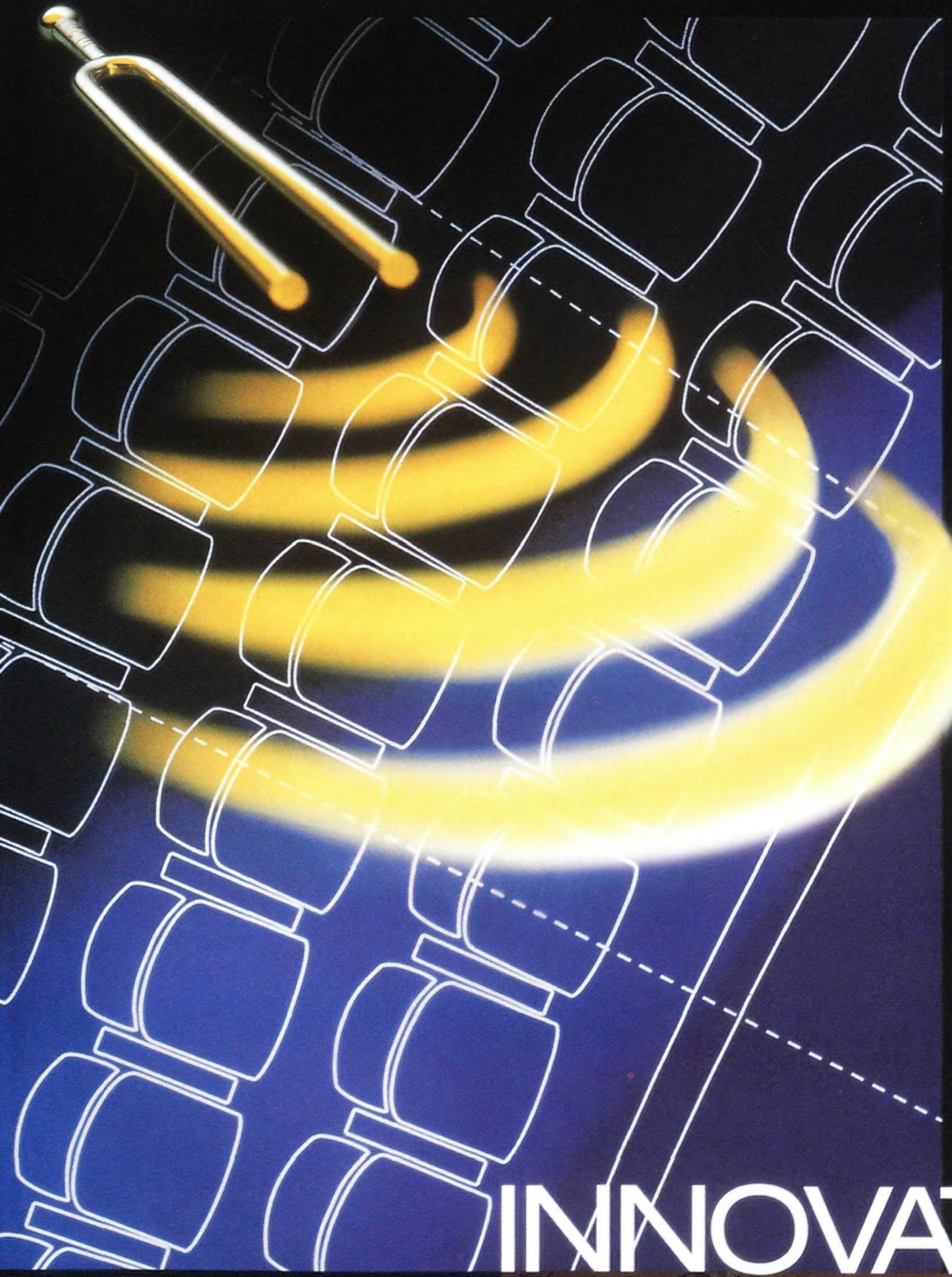

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departments

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Cover For Israeli "airchitect" Doron Gazit, an inflatable tube is a three-dimensional line with which to create a drawing or work of nature. Here, in a "sculpting the wind" project atop Israel's Nizzana sand dunes, long translucent tubes, tied only at one end, fill with wind as they are held aloft at sunset.
PHOTOGRAPH BY DORON GAZIT

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Reading the Bones

A NOTE FROM THE SECRETARY

ON A TABLE IN A NONDESCRIPT ROOM IN THE National Museum of Natural History lies a set of disarticulated bones arranged in a familiar pattern. But the resemblance to a human skeleton is not quite complete. The bones have been broken and reassembled, and weathered by time and exposure to soil. Douglas Owsley, a forensic anthropologist at the museum, points to a sign of imperfection in one knee joint and says the man was shot.

The skeleton is from an early-17th-century grave in Jamestown, Virginia, and the shooting took place centuries ago. But as Owsley speaks of the injury to the bones, the centuries fall away, and the listener's imagination goes to work. The skeleton is no longer an anonymous disposition of collagen, calcium and phosphorus, but a person, of a certain age and physical stature and medical history.

Skeletal details can provide the keys to unlocking criminal mysteries and human history.

When Owsley and his colleagues look at bones, they see changes in texture and form that are evidence of disease. They see variations in size and shape that tell of age, sex, musculature, handedness and repetitive lifetime activities. Molecular and biochemical analyses of bone samples can yield DNA and dietary information, and sometimes isolate antibodies that enrich our understanding of the incidence and transmission of disease in the past.

The bones can record aspects of an individual life or of a community; they can reveal customs and conflicts. Sometimes they can preserve information about evolutionary history. For example, the study of skeletal remains, in conjunction with new archaeological discoveries, may challenge the history of the original colonization of the Americas. The long-held theory that all New World native peoples are the direct descendants of a small band of big-game hunters who came to the Americas some 11,500 years ago may no longer suffice. Skeletal evidence from North and South America dating back at least 10,000 years indicates that the New World may have been colonized on numerous different occasions, beginning thousands of years earlier than previously thought, and that the colonizing groups may have come from different regions in the Old World.

Because of their skill at piecing together lives from skeletal clues, forensic anthropologists have been enlisted as allies by law enforcement and public health agencies to help identify victims of accidental or intentional death. In fact, the tradition of forensic anthropology at our Natural History Museum goes back half a century. The scientific skills honed on evidence centuries and even millennia old, from which time and distance have drained emotion, can be invaluable in grim contemporary circumstances that are often charged with live and painful emotions.

Smithsonian scientists have been involved in identifying victims of serial killer Jeffrey Dahmer, of the fire in the Branch Davidian compound and of war in Croatia. In the Dahmer case, our scientists were able to make a positive identification of his first victim, though the fragmented and incomplete remains had been exposed to the elements for many years. The anthropologists succeeded because they were able to match osteological features evident in antemortem and postmortem x-rays of a cervical vertebra of the victim. Such work has built a portfolio of case studies that advances the field of forensic anthropology and helps develop the skills of a new generation of investigators.

Not every case is so notorious, of course, but in every one the final disposition of one or more human lives is at stake. That's one reason Doug Owsley thinks of the forensic work as a public service. It may lead to the punishment of individuals who have engaged in violently destructive acts. But it is also work of humane consequence for the living. Most victims have families, relatives and friends whose lives have been shattered by loss and uncertainty. The skill of the forensic anthropologist cannot lessen the anguish of loss, but it can lessen the anguish of doubt. In so doing, it serves science, justice and humanity.

LAWRENCE M. SMALL, SECRETARY

ROBERT BURKE

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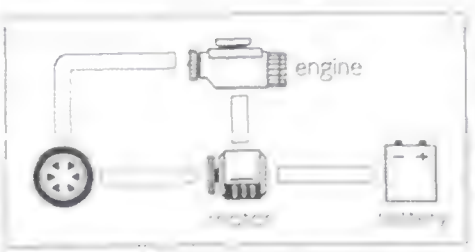

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L. FRANK BAUM

IT WAS GREAT TO READ ABOUT THE Land of Oz in Bruce Watson's "The Amazing Author of Oz" in the June 2000 issue. I consumed the entire series of books. You mentioned *The Marvelous Land of Oz*, in which a boy named Tip travels to the Emerald City and finds it "taken over by a female army wielding knitting needles." Tip and his cohorts liberate the Emerald City and discover that its rightful ruler is none other than Tip himself. Or herself, as it turns out. Mombi, an old wicked witch, had hidden the girl ruler, Princess Ozma, by turning her into Tippetarius, who was called Tip, for short.

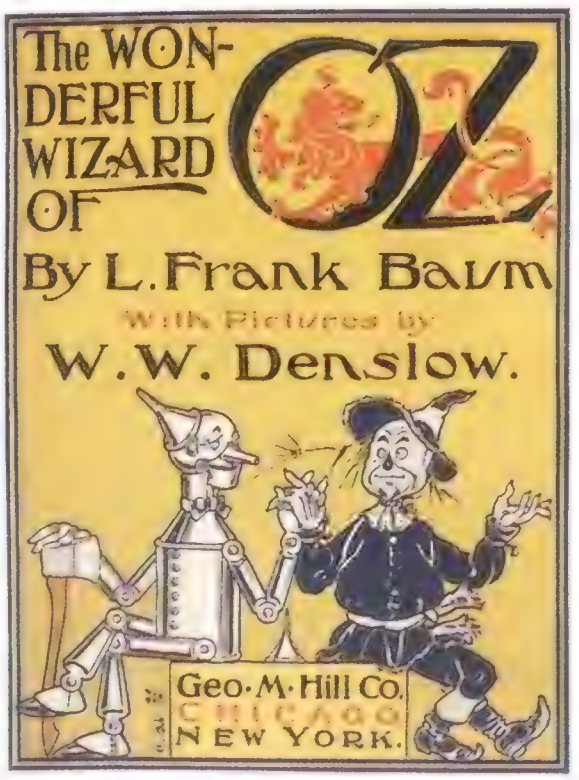
When Glinda the Good said Tip must be turned back into a girl, he wasn't a bit happy. The Tin Woodman told Tip, "Never mind, old chap . . . it don't hurt to be a girl, I'm told; and we will all remain your faithful friends just the same. And to be honest with you, I've always considered girls nicer than boys." The Scarecrow noted, "They're just as nice, anyway."

After a potion, flaming magical powder and a witch's incantation, Tip woke up as "a young girl, fresh and beautiful as a May morning"—the same Tip, only different.

Joanne Maynard
Helena, Montana

EVER SINCE L. FRANK BAUM WROTE *The Wonderful Wizard of Oz*, readers have speculated on whom the character Dorothy was based. Some people believe that Baum named the character after a niece, Dorothy Gage, who was born to Sophie and Thomas Clarkson Gage—Maud Gage Baum's sister-in-law and brother—on June 11, 1898. Maud doted on her infant niece and was heartbroken when the baby died five months later. Baum may have immortalized the little girl in his 1900 novel out of deference to his grieving wife.

In 1996, while researching a biography of Maud's mother, suffragette Matilda Joslyn Gage, Sally Roesch Wagner discovered the weatherworn marble marker of Dorothy Gage in the Evergreen Memorial Cemetery in Bloomington, Illinois. Mickey Carroll, a former Munchkin, donated a new granite marker for Dorothy Gage, which was dedicated in 1997.



Baum repeatedly denied throughout his life that he had named Dorothy in Oz after anyone. Dorothy was a popular girl's name at the turn of the century that Baum had already used in his 1897 *Mother Goose in Prose*.

Hal Woods
Chicago, Illinois

BRUCE WATSON'S OTHERWISE SUPERB article underplayed, in his brief comment, the meaning of *The Wizard of Oz* as a political satire. I absolutely disagree with Watson's conclusion that Oz was written solely for the amusement of children. The Cowardly Lion symbolized Populist William Jennings Bryan. The Scarecrow was the Midwestern farmer, who had plenty of heart but no brain. The Tin Woodman represented the industrial Northeast, which was loaded with brains but totally without heart.

The name "Oz" may have come from the letters on a cabinet, but it is also the abbreviation for a troy ounce, the unit by which both gold and silver are measured. Dorothy's shoes were silver; the Yellow Brick Road was paved with gold bullion.

Norton N. Black
Tucson, Arizona

Since the 1964 publication of Henry M. Littlefield's article "The Wizard of Oz: A Parable on Populism," many scholars have been deconstructing *The Wonderful Wizard of Oz*. In 1992 Littlefield wrote that his intention in publishing the 1964 article was "to suggest another means to teach a difficult period in American history." Nothing in the Baum family histories and letters, interviews with Baum, or contemporary published accounts indicates that Baum's motives went deeper than entertaining children. Ed.

MIT'S TOUCH LAB

RICHARD WOLKOMIR'S FASCINATING article about the human hand, "Charting the Terrain of Touch," solved a long-standing personal mystery for me. While working at the joiner in my wood shop a few years ago, I left my left pinkie on the shop floor. I still can't reach a full five-note bass chord on the piano, but I can type as fast as I always could.

After weeks of recovery, I attempted typing. Within days, the left ring finger assumed the duties of the missing digit, without any extra thought or effort. I presumed that the brain initiated the change, but I now know from the Laboratory for Human and Machine Haptics at the Massachusetts Institute of Technology that the hand tells the brain when adjustments need to be made.

Thank you for this insight. Now if

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Brief Summary of Prescribing Information as of April 1998

ALLEGRA®
(fexofenadine hydrochloride) Capsules
60 mg

INDICATIONS AND USAGE
ALLEGRA is indicated for the relief of symptoms associated with seasonal allergic rhinitis in adults and children 12 years of age and older. Symptoms treated effectively include sneezing, rhinorrhea, itchy nose/palate/throat, watery/red eyes.

CONTRAINDICATIONS
ALLEGRA is contraindicated in patients with known hypersensitivity to any of its ingredients.

PRECAUTIONS
Drug Interactions
In two separate studies, fexofenadine hydrochloride 120 mg twice daily (twice the recommended dose) was co-administered with erythromycin 500 mg every 8 hours or ketoconazole 400 mg once daily under steady-state conditions to normal, healthy volunteers (n=24, each study). No differences in adverse events or QTc interval were observed when subjects were administered fexofenadine hydrochloride alone or in combination with erythromycin or ketoconazole. The findings of these studies are summarized in the following table:

Effects on Steady-State Fexofenadine Pharmacokinetics After 7 Days of Co-Administration with Fexofenadine Hydrochloride 120 mg Every 12 Hours (twice recommended dose) in Normal Volunteers (n=24)

Concomitant Drug	C_{max} *(Peak plasma concentration)*	$AUC_{(0-12h)}$ *(Extent of systemic exposure)*
Erythromycin (500 mg every 8 hrs)	+82%‡	+109%‡
Ketoconazole (400 mg once daily)	+135%‡	+164%‡

‡ Statistically significant

The mechanisms of these interactions are unknown, and the potential for interaction with other azole antifungal or macrolide agents has not been studied. These changes in plasma levels were within the range of plasma levels achieved in adequate and well-controlled clinical trials. Fexofenadine had no effect on the pharmacokinetics of erythromycin or ketoconazole.

Carcinogenesis, Mutagenesis, Impairment of Fertility
The carcinogenic potential and reproductive toxicity of fexofenadine hydrochloride were assessed using terfenadine studies with adequate fexofenadine exposure (based on plasma area-under-the-curve [AUC] values). No evidence of carcinogenicity was observed when mice and rats were given daily oral doses of 50 and 150 mg/kg of terfenadine for 18 and 24 months, respectively; these doses resulted in plasma AUC values of fexofenadine that were up to four times the human therapeutic value (based on a 60-mg twice-daily fexofenadine hydrochloride dose).
In in-vitro (Bacterial Reverse Mutation, CHO/HGPRT Forward Mutation, and Rat Lymphocyte Chromosomal Aberration assays) and in-vivo (Mouse Bone Marrow Micronucleus assay) tests, fexofenadine hydrochloride revealed no evidence of mutagenicity.
In rat fertility studies, dose-related reductions in implants and increases in post-implantation losses were observed at oral doses equal to or greater than 150 mg/kg of terfenadine; these doses produced plasma AUC values of fexofenadine that were equal to or greater than three times the human therapeutic value (based on a 60-mg twice-daily fexofenadine hydrochloride dose).

Pregnancy
Teratogenic Effects: Category C. There was no evidence of teratogenicity in rats or rabbits at oral terfenadine doses up to 300 mg/kg; these doses produced fexofenadine plasma AUC values that were up to 4 and 37 times the human therapeutic value (based on a 60-mg twice-daily fexofenadine hydrochloride dose), respectively.
There are no adequate and well-controlled studies in pregnant women. Fexofenadine hydrochloride should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.
Nonteratogenic Effects. Dose-related decreases in pup weight gain and survival were observed in rats exposed to oral doses equal to and greater than 150 mg/kg of terfenadine; at these doses the plasma AUC values of fexofenadine were equal to or greater than 3 times the human therapeutic values (based on a 60-mg twice-daily fexofenadine hydrochloride dose).

Nursing Mothers
There are no adequate and well-controlled studies in women during lactation. Because many drugs are excreted in human milk, caution should be exercised when fexofenadine hydrochloride is administered to a nursing woman.

Pediatric Use
Safety and effectiveness of ALLEGRA in pediatric patients under the age of 12 years have not been established. Across well-controlled clinical trials in patients with seasonal allergic rhinitis, a total of 285 patients between the ages of 12 to 15 years received doses ranging from 20 mg to 240 mg twice daily for up to two weeks. Adverse events were similar in this group compared to patients above the age of 16 years.

Geriatric Use
In placebo-controlled trials, 42 patients, age 60 to 86 years, received doses of 20 mg to 240 mg of fexofenadine twice daily for up to two weeks. Adverse events were similar in this group to patients under age 60 years.

ADVERSE REACTIONS
In placebo-controlled clinical trials, which included 2461 patients receiving fexofenadine hydrochloride at doses of 20 mg to 240 mg twice daily, adverse events were similar to fexofenadine hydrochloride and placebo-treated patients. The incidence of adverse events, including drowsiness, was not dose-related and was similar across subgroups defined by age, gender, and race. The percent of patients who withdrew prematurely because of adverse events was 2.2% with fexofenadine hydrochloride vs 3.3% with placebo. All adverse events that were reported by greater than 1% of patients who received the recommended daily dose of fexofenadine hydrochloride (60 mg twice daily), and that were more common with fexofenadine than placebo, are listed in the following table:

Adverse Experiences Reported in Placebo-Controlled Seasonal Allergic Rhinitis Clinical Trials at Rates of Greater Than 1%

Adverse Experience	*Fexofenadine 60 mg Twice Daily (n=679)*	*Placebo Twice Daily (n=671)*
Viral Infection (cold, flu)	2.5%	1.5%
Nausea	1.6%	1.5%
Dysmenorrhea	1.5%	0.9%
Drowsiness	1.3%	0.9%
Dyspepsia	1.3%	0.6%
Fatigue	1.3%	0.9%

Adverse events occurring in greater than 1% of fexofenadine hydrochloride-treated patients (60 mg twice daily), but that were more common in the placebo-treated group, include headache and throat irritation.
The frequency and magnitude of laboratory abnormalities were similar in fexofenadine hydrochloride and placebo-treated patients.

Prescribing Information as of April 1998

Hoechst Marion Roussel, Inc. 98250207/0897E9
Kansas City, MO 64137 USA

US Patents 4,254,129; 5,375,693; 5,578,610

aib0498b

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I can just get my wife to refrain from telling everyone that she can no longer count on me, we'll have the whole matter in hand.

Bill Mitchell
Trout Lake, Washington

I WAS THE TIMPANIST FOR *OLD MAN River*, a musical portrait of Paul Robeson at Hollywood's Matrix Theatre, and complained to our musical director, Robert A. "Bumps" Blackwell, about my tired arms. The famous musician, arranger and producer behind Little Richard, Sam Cook and others admonished me, "Don't you use your fingers?" I've exercised my fingers on a short length of two-by-four ever since.

Maurice S. Cahn
Landers, California

MANDAYAM SRINIVASAN'S DISCOVERY that the deaf can hear through their hands is not a new concept to me. My maternal grandmother, who was deaf for 70 of her 88 years, listened to music in this manner starting in the early days of radio until her death in 1976. She "heard" me play accordion by standing behind me and feeling the music as the instrument moved.

Elaine L. Walkden
Sheffield Lake, Ohio

EXPERIENCE MUSIC PROJECT

"A SWOOPY, FUNKY FUN HOUSE OF Rock" by Richard Covington, about Paul G. Allen and Jody Allen Patton's rock and pop repository, was great, but I was greatly saddened that he didn't mention the famous Gretsch guitar. My father worked for Fred Gretsch in Brooklyn for 38 years and produced some of the world's finest guitars, including Beatle George Harrison's 12-string Country Gentleman.

Vincent De Rosa
Napanock, New York

I WAS REARED IN SEATTLE, AND I watched it expand from a small provincial town into a thriving metropolis. I also grew up on rock and roll. I have followed the construction of the Experience Music Project (EMP), and in its completed state, it looks as if a 777 jumbo jet crash-landed into the hillside. The EMP is by far the ugliest building I have ever seen and does little justice to the musical heritage of our city. The EMP's architect, Frank Gehry, should be discouraged from ever again applying pencil to paper.

Peter Maslan
Seattle, Washington

AFTER SEEING STEVE GOTTLIEB'S PICtures of Seattle's Experience Music Project, I can't help but think that the area's dentists must be pleased. The museum's exterior looks like nothing more than a worn-down back molar.

Art Shaw
Lucerne, California

ENGLAND'S CANALS

SUSAN HORNIK'S ARTICLE "AFLOAT with Fly Boats and Leggers," with its beautiful photographs by Michael Freeman, was especially interesting to me. To celebrate the millennium, our National Heritage Corridor Commission, and more than 70 corporations, foundations and individuals, commissioned and helped fund a 40-foot, British-built canal boat named the *Samuel Slater* that cruises a two-and-a-half-mile stretch of the Blackstone River. Canal enthusiasts who can't make it to England can come to Providence, Rhode Island. In the British tradition, the *Samuel Slater* also serves as a bed-and-breakfast.

Robert D. Billington
Blackstone Valley Tourism Council
Pawtucket, Rhode Island

SUSAN HORNIK'S ARTICLE GAVE ME A new perspective on the subject. My view of these picturesque, slow-flowing streams had been derived from what I think is the funniest book in the English language: *Three Men in a Boat: (To Say Nothing of the Dog!)* by Jerome K. Jerome. First published in

1889, the book is Jerome's account of a two-week, mishap-filled excursion up the River Thames with his friends Harris and George and a fox terrier named Montmorency.

Margaret M. Maher
Beaumont, California

YOUR READERS MAY ENJOY COLIN Dexter's *The Wench is Dead*. Dexter's protagonist, Inspector Morse, is recuperating in a hospital and stumbles upon the 100-year-old case of a woman who was murdered on the Oxford Canal, and he sets out to prove the innocence of the two men hanged for the crime. The author's meticulous documentation of the workings of the canal is great reading.

D. Ferrant
Beverly Hills, California

THE OBJECT AT HAND

I ENJOYED JULIE WAKEFIELD'S COLUMN "The 'Indomitable' MRI." One tidbit that she omitted was a marketing decision that was made to sell the use of the technology to a wary public. The name nuclear magnetic resonance (NMR) was changed to magnetic resonance imaging (MRI) because some people were concerned about the word "nuclear."

Edgar Canada, M.D.
San Diego, California

Some public fear of the word "nuclear" existed, even though no radiation of any kind is involved in MRIs. Ed.

THE LAST PAGE

I READ DANNY HEITMAN'S COLUMN about coping with the words "some assembly required" and thought about other "three little words" I've encountered that aren't "I love you." My disappointments have included the phrases "dry clean only"; "sorry, we're closed"; "return to sender"; and "batteries not included."

Zoe MacKenzie
Longview, Washington

WRITE TO SMITHSONIAN

Letters for consideration in this column must include your daytime telephone number, full name and postal address. Transmit mail to LettersEd@simag.si.edu or send it to Smithsonian Letters Editor, P.O. Box 44400, Washington, D.C. 20026-4400. Letters may be edited for clarity and length.

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POINTS OF INTEREST

The Last Schoolhouse

WHEN A HANDFUL OF SENIOR CITIZENS REVISIT THE SCHOOL THEY ATTENDED YEARS AGO, THEY BECOME CHILDREN AGAIN

BY RUDOLPH CHELMINSKI

THERE AREN'T MANY PEOPLE AROUND WILTON anymore who know who Miss Post was. But Nancy Cole does, and Sister Mary Jane Card, and Julia Monroe and Everett "Evy" Hurlbut, Jr., and my big brother Duba, and a few others like them. How could they forget? She was just about the most important person in town back then.

"Back then" was the 1930s, and Miss Post was the teacher of the Hurlbutt Street School, Wilton's last one-room schoolhouse. To write "the" teacher seems slightly absurd nowadays, especially in the context of Wilton, a leafy suburb in southwestern Connecticut with a 3,845-student school system that employs more than 300 teachers, aides, guidance counselors and other specialists. Yet only yesterday this was a tiny farm community with winding dirt roads where the kids walked to one-room schoolhouses.

It is a reminder of how much the United States has changed, and how astonishingly fast, to meet with some of those now rather more elderly kids, as I did the other day, in the Hurlbutt Street School. Built in 1834, it is still standing as a museum not much more than a stone's throw from the big white house on Sharp Hill Road where I was born.

The fall of 1934 was Duba's first year in school and the very last one before Wilton finished consolidating its entire educational system into the big brick, steel and concrete Center School, which was served by a brand-new bus company operated by John Disbrow, who doubled as the town's fire chief. Duba had only a year in the little schoolhouse, Nancy Cole had three and Mary Jane Card had seven, but Julia Monroe and Evy Hurlbut went through all eight grades there. Whether it was one year or eight, everyone who was lucky enough to have had Miss Post as a teacher remembers her vividly.

Angeline was her name—"Angie" for those who knew her well enough. She was a local girl whose father had the wonderful name of Washington Post. Right on through the 1940s, she was the closest thing Wilton had to a universally revered figure, because we all came alive to learning in the third-grade class she took over in the Center School. And if having her for one year was such a pivotal experience for us Center School youngsters, it was even more so for the big kids who came before us, the ones who had Miss Post all to themselves for as many as eight.

Rounding up a representative sampling of those lucky ones proved to be surprisingly easy. All it took was a cou-

In 1934 Angie Post posed with her pupils at the Hurlbutt Street School, now a museum displaying books and a bell (above).

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ple of phone calls, and within hours Nancy and Julia and Evy had dropped everything to come and join me in the Hurlbutt School's classroom. They would do anything, it seemed, for Miss Post. Scrunched down behind little sloping desks similar to the ones they occupied 65 or more years earlier, they jabbered with infectious enthusiasm about their school days as a fire in the woodstove popped and crackled. In other hours of their lives, they may have been serious senior citizens, but now they joked and

Classmates reunited at the Hurlbutt Street School include the author's brother Duba, who is seated in the middle.

laughed and argued and carried on like . . . well, like kids. No wonder psychologists have done studies on how place and architecture influence human moods.

Duba wasn't able to get away from work that afternoon, but he had filled me in earlier on his recollections. "You can't really be expected to remember much from first grade," he said apologetically, and of course he was right. (My only pertinent memory of first grade involves eating paste that tasted vaguely of mint.) "But I do remember Angie's teaching method very clearly. She would lean over your desk, or even squiggle onto part of your seat, and review your reading lesson with you. She would go through the kids one by one like that, then come back to you later to see how you were doing. I don't know if I can make any valid comparisons of this teaching method to more modern approaches, but I'm certain about one thing: if any of Angie's kids had a learning problem, she knew it right away."

In those early years, Miss Post would handle as many as 30 children at once, and as was customary for one-room schoolhouses, the little ones sat up front, with the bigger ones toward the rear in ascending order. "The little kids would hear what was going on in the lessons of the bigger ones behind them, so they already had an idea of what was coming up for them later," said Julia, an irrepressibly cheerful 81-year-old. "Knowing what was going on gave them a head start." The others nodded agreement.

Mary Jane Card—*Sister* Mary Jane, for she is a nun whose life had been so influenced by Miss Post that she became a teaching professional herself—remembers that Angie often deputized better students from the upper grades as teaching assistants, to help the little ones with the lessons they themselves had learned in earlier years. It must have been a disorderly kind of arrangement, with all the different subjects and levels and cross-currents and kaleidoscopic chatter, but apparently young minds must thrive on that sort of thing. Rather than breeding confusion, the intellectual ferment in that little room proved to be a creative compost, and the kids loved it. The school was more like an extension of the family than an institution. Little kids learn from big. How simple. How normal.

WHEN THRIFT COUNTED, STUDENTS SAVED

WILTON HAD NINE LITTLE SCHOOLHOUSES SCATTERED around town in those days, and the kids made their way from home and back on foot. It was the Depression, after all, and there was no money for frivolities like transportation. For her $1,150 yearly salary, Miss Post was expected not only to instruct her charges in the three R's but to lead them into the ways of thrift and frugality. Each child had a bankbook, and each one put in 10 cents a week, solemnly noted and stamped.

Thrift counted. People around Wilton tilled vegetable gardens, and kept chickens and often pigs too. To overwinter carrots, our parents buried them in the cellar, and they preserved cabbages by digging a ditch in the ground and covering them with straw. Mothers made soap from lard; fathers mended shoes with old bits of saddle leather, and when the kids walked they went *squeak-squeak*. When Nancy recounted how her mom would make dresses for her out of chicken feed sacks, the other women erupted in

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laughter of instant recognition: *everyone* did that back then.

There was almost never any homework with Miss Post, Evy explained, because she knew the kids were too busy with their chores in the afternoon. Youngsters were expected to pitch in at the school too. "Danny Sturges would come in early and get the fire started in the morning," said Evy. "Shake 'er down, open up the draft and let

Everett "Evy" Hurlbut, Jr., takes his hat off to a dummy bearing his name at the front of his old classroom.

'er go. Julia's brother Leonard and I were water boys. We'd take a bucket to Leonard's mom's house, or walk to the corner to Percy Knapp's place and fill it from the well. Then we'd bring the bucket to school and empty it in the big earthen crock near Miss Post's desk."

Each kid had his or her tin cup hanging on a nail, and anyone who wanted a drink would hold up a hand for permission. Same thing for going to the outhouses, the two two-holers, one for boys and one for girls, back behind the school.

The school days repeated themselves in immutable routine, beginning with a standing Pledge of Allegiance, then the Lord's Prayer and then on to the assignments. Over the stove hung the standard portrait of George Washington, the one with the facial expression as enigmatic as Mona Lisa's. The ABC Primary Reading Chart stood near the blackboard, and on the blackboard was Angie's favorite slogan: Busy people are happy people.

Julia's mom, Mrs. Carvutto, lived across the street from the schoolhouse, and at noontime she often gave the kids fresh, hot bread of her own baking, slicing it thickly, the big loaf held firmly against her chest as she cut sideways. Soon Nancy's mom and Mrs. Shipman, a retired teacher who lived down the road, went a step further by delivering soup to the school, in a big kettle placed ceremoniously on the stove to keep warm until 12:00, when the kids would drink it from their tin cups. Thus was born a precursor of Wilton's hot-lunch program.

The rustic ways changed yet again when one of the town's citizens, an electrical engineer, donated a radio. Miss Post's brood first sensed the magic world of multimedia when they listened to Herbert Hoover's inauguration in 1929.

IN RETIREMENT, A BELOVED FIGURE

ANGIE POST NEVER MARRIED. SHE WAS WEDDED FIRST TO her schoolhouse and then to her third-graders, and she hung around in the school system as long as she possibly could. After she reluctantly took her retirement, growing white-haired and frail as the years passed, she remained a familiar personage in and around Wilton center, always smiling and almost always remembering the kid names of the huge adults who frequently came up to greet her.

For years, Wiltonians smiled indulgently at the spectacle of Angie and her sister, also a teacher and also a maiden lady, two white heads barely visible over the dashboard of their big old black Chevrolet, cruising down Route 7 at a stately 25 miles per hour while a huge line of cars stacked up behind them.

I was gone from Wilton by the time Miss Post died, so I don't know what her funeral was like, but for a while the grateful town remembered her by naming the new elementary school off Grumman Hill Road after her. Then more years passed and priorities changed and new people arrived and eventually the place got sold and was turned into a private school with a different name.

There's no point, of course, in bemoaning the passing of an earlier, simpler time when kids walked to school, when the naughtiest thing they did was to smoke corn silk and when the houses didn't even have locks on the doors. The world is what human ingenuity has made it, and maybe the schoolchildren today *are* better off and smarter with their cellular phones and computers and video games. Still it would be nice if Wilton could find a way to remember Angie Post just a little bit longer. I'll bet the town could afford to put a brass plaque somewhere in that one-room schoolhouse on Hurlbutt Street.

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Brief Summary - see package insert for full prescribing information. **INDICATIONS AND USAGE** ARICEPT® is indicated for the treatment of mild to moderate dementia of the Alzheimer's type. **CONTRAINDICATIONS** ARICEPT® is contraindicated in patients with known hypersensitivity to donepezil hydrochloride or to piperidine derivatives. **WARNINGS** ***Anesthesia:*** ARICEPT®, as a cholinesterase inhibitor, is likely to exaggerate succinylcholine-type muscle relaxation during anesthesia. ***Cardiovascular Conditions:*** Because of their pharmacological action, cholinesterase inhibitors may have vagotonic effects on heart rate (e.g., bradycardia). The potential for this action may be particularly important in patients with "sick sinus syndrome" or other supraventricular cardiac conduction conditions. Syncopal episodes have been reported in association with the use of ARICEPT®. ***Gastrointestinal Conditions:*** Through their primary action, cholinesterase inhibitors may be expected to increase gastric acid secretion due to increased cholinergic activity. Therefore, patients should be monitored closely for symptoms of active or occult gastrointestinal bleeding, especially those at increased risk for developing ulcers, e.g., those with a history of ulcer disease or those receiving concurrent nonsteroidal anti-inflammatory drugs (NSAIDS). Clinical studies of ARICEPT® have shown no increase, relative to placebo, in the incidence of either peptic ulcer disease or gastrointestinal bleeding. ARICEPT®, as a predictable consequence of its pharmacological properties, has been shown to produce diarrhea, nausea and vomiting. These effects, when they occur, appear more frequently with the 10 mg/day dose than with the 5 mg/day dose. In most cases, these effects have been mild and transient, sometimes lasting one to three weeks, and have resolved during continued use of ARICEPT®. ***Genitourinary:*** Although not observed in clinical trials of ARICEPT®, cholinomimetics may cause bladder outflow obstruction. ***Neurological Conditions:*** Seizures. Cholinomimetics are believed to have some potential to cause generalized convulsions. However, seizure activity also may be a manifestation of Alzheimer's Disease. ***Pulmonary Conditions:*** Because of their cholinomimetic actions, cholinesterase inhibitors should be prescribed with care to patients with a history of asthma or obstructive pulmonary disease. **PRECAUTIONS Drug-Drug Interactions** ***Drugs Highly Bound to Plasma Proteins:*** Drug displacement studies have been performed *in vitro* between this highly bound drug (95%) and other drugs such as furosemide, digoxin, and warfarin. ARICEPT® at concentrations of 0.3-10 µg/mL did not affect the binding of furosemide (5 µg/mL), digoxin (2 ng/mL), and warfarin (3 µg/mL) to human albumin. Similarly, the binding of ARICEPT® to human albumin was not affected by furosemide, digoxin, and warfarin. ***Effect of ARICEPT® on the Metabolism of Other Drugs:*** No *in vivo* clinical trials have investigated the effect of ARICEPT® on the clearance of drugs metabolized by CYP 3A4 (e.g. cisapride, terfenadine) or by CYP 2D6 (e.g. imipramine). However, *in vitro* studies show a low rate of binding to these enzymes (mean K_i about 50-130 µM), that, given the therapeutic plasma concentrations of donepezil (164 nM), indicates little likelihood of interference. Whether ARICEPT® has any potential for enzyme induction is not known. ***Effect of Other Drugs on the Metabolism of ARICEPT®:*** Ketoconazole and quinidine, inhibitors of CYP450, 3A4 and 2D6, respectively, inhibit donepezil metabolism *in vitro*. Whether there is a clinical effect of these inhibitors is not known. Inducers of CYP 2D6 and CYP 3A4 (e.g., phenytoin, carbamazepine, dexamethasone, rifampin, and phenobarbital) could increase the rate of elimination of ARICEPT®. ***Use with Anticholinergics:*** Because of their mechanism of action, cholinesterase inhibitors have the potential to interfere with the activity of anticholinergic medications. ***Use with Cholinomimetics and Other Cholinesterase Inhibitors:*** A synergistic effect may be expected when cholinesterase inhibitors are given concurrently with succinylcholine, similar neuromuscular blocking agents or cholinergic agonists such as bethanechol. **Carcinogenesis, Mutagenesis, Impairment of Fertility** Carcinogenicity studies of donepezil have not been completed. Donepezil was not mutagenic in the Ames reverse mutation assay in bacteria. In the chromosome aberration test in cultures of Chinese hamster lung (CHL) cells, some clastogenic effects were observed. Donepezil was not clastogenic in the *in vivo* mouse micronucleus test. Donepezil had no effect on fertility in rats at doses up to 10 mg/kg/day (approximately 8 times the maximum recommended human dose on a mg/m² basis). **Pregnancy** ***Pregnancy Category C:*** Teratology studies conducted in pregnant rats at doses up to 16 mg/kg/day (approximately 13 times the maximum recommended human dose on a mg/m² basis) and in pregnant rabbits at doses up to 10 mg/kg/day (approximately 16 times the maximum recommended human dose on a mg/m² basis) did not disclose any evidence for a teratogenic potential of donepezil. However, in a study in which pregnant rats were given up to 10 mg/kg/day (approximately 8 times the maximum recommended human dose on a mg/m² basis) from day 17 of gestation through day 20 postpartum, there was a slight increase in still births and a slight decrease in pup survival through day 4 postpartum at this dose, the next lower dose tested was 3 mg/kg/day. There are no adequate or well-controlled studies in pregnant women. ARICEPT® should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Nursing Mothers** It is not known whether donepezil is excreted in human breast milk. ARICEPT® has no indication for use in nursing mothers. **Pediatric Use** There are no adequate and well-controlled trials to document the safety and efficacy of ARICEPT® in any illness occurring in children. **ADVERSE REACTIONS Adverse Events Leading to Discontinuation** The rates of discontinuation from controlled clinical trials of ARICEPT® due to adverse events for the ARICEPT® 5 mg/day treatment groups were comparable to those of placebo-treatment groups at approximately 5%. The rate of discontinuation of patients who received 7-day escalations from 5 mg/day to 10 mg/day, was higher at 13%. The most common adverse events leading to discontinuation, defined as those occurring in at least 2% of patients and at twice the incidence seen in placebo patients, are shown in Table 1.

Table 1. Most Frequent Adverse Events Leading to Withdrawal from Controlled Clinical Trials by Dose Group

Dose Group	Placebo	5 mg/day ARICEPT®	10 mg/day ARICEPT®
Patients Randomized	355	350	315
Event/% Discontinuing			
Nausea	1%	1%	3%
Diarrhea	0%	<1%	3%
Vomiting	<1%	<1%	2%

Most Frequent Adverse Clinical Events Seen in Association with the Use of ARICEPT® The most common adverse events, defined as those occurring at a frequency of at least 5% in patients receiving 10 mg/day and twice the placebo rate, are largely predicted by ARICEPT®'s cholinomimetic effects. These include nausea, diarrhea, insomnia, vomiting, muscle cramp, fatigue and anorexia. These adverse events were often of mild intensity and transient, resolving during continued ARICEPT® treatment without the need for dose modification. There is evidence to suggest that the frequency of these common adverse events may be affected by the rate of titration. An open-label study was conducted with 269 patients who received placebo in the 15- and 30-week studies. These patients were titrated to a dose of 10 mg/day over a 6-week period. The rates of common adverse events were lower than those seen in patients titrated to 10 mg/day over one week in the controlled clinical trials and were comparable to those seen in patients on 5 mg/day. See Table 2 for a comparison of the most common adverse events following one and six week titration regimens.

Table 2. Comparison of Rates of Adverse Events in Patients Titrated to 10 mg/day Over 1 and 6 Weeks

	No titration		One-week titration	Six-week titration
Adverse Event	Placebo (n=315)	5 mg/day (n=311)	10 mg/day (n=315)	10 mg/day (n=269)
Nausea	6%	5%	19%	6%
Diarrhea	5%	8%	15%	9%
Insomnia	6%	6%	14%	6%
Fatigue	3%	4%	8%	3%
Vomiting	3%	3%	8%	5%
Muscle cramps	2%	6%	8%	3%
Anorexia	2%	3%	7%	3%

Adverse Events Reported in Controlled Trials The events cited reflect experience gained under closely monitored conditions of clinical trials in a highly selected patient population. In actual clinical practice or in other clinical trials, these frequency estimates may not apply, as the conditions of use, reporting behavior, and the kinds of patients treated may differ. Table 3 lists treatment emergent signs and symptoms that were reported in at least 2% of patients in placebo-controlled trials who received ARICEPT® and for which the rate of occurrence was greater for ARICEPT® assigned than placebo assigned patients. In general, adverse events occurred more frequently in female patients and with advancing age.

Table 3. Adverse Events Reported in Controlled Clinical Trials in at Least 2% of Patients Receiving ARICEPT® (donepezil HCl) and at a Higher Frequency than Placebo-treated Patients

Body System/Adverse Event	Placebo (n=355)	ARICEPT® (n=747)
Percent of Patients with any Adverse Event	72	74
Body as a Whole		
Headache	9	11
Pain, various locations	8	9
Accident	6	7
Fatigue	3	5
Cardiovascular System		
Syncope	1	2
Digestive System		
Nausea	6	11
Diarrhea	5	10
Vomiting	3	5
Anorexia	2	3
Hemic and Lymphatic System		
Ecchymosis	3	4
Metabolic and Nutritional Systems		
Weight Decrease	1	3
Musculoskeletal System		
Muscle Cramps	2	6
Arthritis	1	2
Nervous System		
Insomnia	6	9
Dizziness	6	8
Depression	<1	3
Abnormal Dreams	1	3
Somnolence	<1	2
Urogenital System		
Frequent Urination	1	2

Other Adverse Events Observed During Clinical Trials ARICEPT® has been administered to over 1700 individuals during clinical trials worldwide. Approximately 1200 of these patients have been treated for at least 3 months and more than 1000 patients have been treated for at least 6 months. Controlled and uncontrolled trials in the United States included approximately 900 patients. In regards to the highest dose of 10 mg/day, this population includes 650 patients treated for 3 months, 475 patients treated for 6 months and 116 patients treated for over 1 year. The range of patient exposure is from 1 to 1214 days. Treatment emergent signs and symptoms that occurred during 3 controlled clinical trials and two open-label trials in the United States were recorded as adverse events by the clinical investigators using terminology of their own choosing. To provide an overall estimate of the proportion of individuals having similar types of events, the events were grouped into a smaller number of standardized categories using a modified COSTART dictionary and event frequencies were calculated across all studies. These categories are used in the listing below. The frequencies represent the proportion of 900 patients from these trials who experienced that event while receiving ARICEPT®. All adverse events occurring at least twice are included, except for those already listed in Tables 2 or 3, COSTART terms too general to be informative, or events less likely to be drug caused. Events are classified by body system and listed using the following definitions: *frequent adverse events* — those occurring in at least 1/100 patients, *infrequent adverse events* — those occurring in 1/100 to 1/1000 patients. These adverse events are not necessarily related to ARICEPT® treatment and in most cases were observed at a similar frequency in placebo-treated patients in the controlled studies. No important additional adverse events were seen in studies conducted outside the United States. **Body as a Whole:** *Frequent*: influenza, chest pain, toothache, *Infrequent*: fever, edema face, periorbital edema, hernia hiatal, abscess, cellulitis, chills, generalized coldness, head fullness, listlessness. **Cardiovascular System:** *Frequent*: hypertension, vasodilation, atrial fibrillation, hot flashes, hypotension, *Infrequent*: angina pectoris, postural hypotension, myocardial infarction, AV block (first degree), congestive heart failure, arteritis, bradycardia, peripheral vascular disease, supraventricular tachycardia, deep vein thrombosis. **Digestive System:** *Frequent*: fecal incontinence, gastrointestinal bleeding, bloating, epigastric pain, *Infrequent*: eructation, gingivitis, increased appetite, flatulence, periodontal abscess, cholelithiasis, diverticulitis, drooling, dry mouth, fever sore, gastritis, irritable colon, tongue edema, epigastric distress, gastroenteritis, increased transaminases, hemorrhoids, ileus, increased thirst, jaundice, melena, polydipsia, duodenal ulcer, stomach ulcer. **Endocrine System:** *Infrequent*: diabetes mellitus, goiter. **Hemic and Lymphatic System:** *Infrequent*: anemia, thrombocythemia, thrombocytopenia, eosinophilia, erythrocytopenia. **Metabolic and Nutritional Disorders:** *Frequent*: dehydration. *Infrequent*: gout, hyperuremia, increased creatine kinase, hyperglycemia, weight increase, increased lactate dehydrogenase. **Musculoskeletal System:** *Frequent*: bone fracture; *Infrequent*: muscle weakness, muscle fasciculation. **Nervous System:** *Frequent*: delusions, tremor, irritability, paresthesia, aggression, vertigo, ataxia, increased libido, restlessness, abnormal crying, nervousness, aphasia. *Infrequent*: cerebrovascular accident, intracranial hemorrhage, transient ischemic attack, emotional lability, neuralgia, coldness (localized), muscle spasm, dysphonia, gait abnormality, hypertonia, hypokinesia, neurodermatitis, numbness (localized), paranoia, dysarthria, dysphasia, hostility, decreased libido, melancholia, emotional withdrawal, nystagmus, pacing. **Respiratory System:** *Frequent*: dyspnea, sore throat, bronchitis. *Infrequent*: epistaxis, post nasal drip, pneumonia, hyperventilation, pulmonary congestion, wheezing, hypoxia, pharyngitis, pleurisy, pulmonary collapse, sleep apnea, snoring. **Skin and Appendages:** *Frequent*: pruritus, diaphoresis, urticaria. *Infrequent*: dermatitis, eczema, skin discoloration, hyperkeratosis, alopecia, fungal dermatitis, herpes zoster, hirsutism, skin striae, night sweats, skin ulcer. **Special Senses:** *Frequent*: cataract, eye irritation, vision blurred. *Infrequent*: dry eyes, glaucoma, earache, tinnitus, blepharitis, decreased hearing, retinal hemorrhage, otitis externa, otitis media, bad taste, conjunctival hemorrhage, ear buzzing, motion sickness, spots before eyes. **Urogenital System:** *Frequent*: urinary incontinence, nocturia. *Infrequent*: dysuria, hematuria, urinary urgency, metrorrhagia, cystitis, enuresis, prostate hypertrophy, pyelonephritis, inability to empty bladder, breast fibrocadenosis, fibrocystic breast, mastitis, pyuria, renal failure, vaginitis. **Postintroduction Reports** Voluntary reports of adverse events temporally associated with ARICEPT® that have been received since market introduction that are not listed above, and that there is inadequate data to determine the causal relationship with the drug include the following: abdominal pain, agitation, cholecystitis, confusion, convulsions, hallucinations, heart block (all types), hemolytic anemia, hepatitis, hyponatremia, pancreatitis, and rash. **OVERDOSAGE Because strategies for the management of overdose are continually evolving, it is advisable to contact a Poison Control Center to determine the latest recommendations for the management of an overdose of any drug.** As in any case of overdose, general supportive measures should be utilized. Overdosage with cholinesterase inhibitors can result in cholinergic crisis characterized by severe nausea, vomiting, salivation, sweating, bradycardia, hypotension, respiratory depression, collapse and convulsions. Increasing muscle weakness is a possibility and may result in death if respiratory muscles are involved. Tertiary anticholinergics such as atropine may be used as an antidote for ARICEPT® overdosage. Intravenous atropine sulfate titrated to effect is recommended: an initial dose of 1.0 to 2.0 mg IV with subsequent doses based upon clinical response. Atypical responses in blood pressure and heart rate have been reported with other cholinomimetics when co-administered with quaternary anticholinergics such as glycopyrrolate. It is not known whether ARICEPT® and/or its metabolites can be removed by dialysis (hemodialysis, peritoneal dialysis, or hemofiltration). Dose-related signs of toxicity in animals included reduced spontaneous movement, prone position, staggering gait, lacrimation, clonic convulsions, decreased respiration, salivation, miosis, tremors, fasciculation and lower body surface temperature.

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Foreign Worm Alert

ALIENS ARE TUNNELING THROUGH NORTH AMERICA. WHO'D HAVE THOUGHT THESE EARTH TILLERS HAVE A DOWNSIDE?

BY ADELE CONOVER

A BOON TO ROBINS, GARDENERS, FARMers, fishermen and even grizzlies, earthworms aerate the soil and bore underground avenues for plant roots and water. Ever since Darwin demonstrated in 1881 that the worms in an acre of land can turn living and dead vegetation into 18 tons of castings every year simply by passing the stuff through their guts, earthworms, we thought, could do no wrong.

As it happens, however, earthworms—at least in some parts of North America—have a downside. The time has come to expose them for what they are: alien invaders. In some farm areas, nitrates are getting into the groundwater via the tunnels of exotic worms. Alien invasions have occurred in tallgrass prairie, Southern grassland and along riverbanks in the Midwest. In the Pacific Northwest, aliens take over forest land that has been clear-cut.

Handfuls of night crawlers (this species came from Europe) are a sight to gladden the heart of any angler. Millions are imported every year from Canada.

One of the best-studied invasions is in the Northern forests. With the efficiency of the sandworms in *Dune* snarfing people and machines, worms in Northern forests are downing what biologists call the duff layer, the cushy bed of decomposing leaf litter that carpets the forest floor

The duff layer is the forest's digestive system. Its microbes and fungi break organic matter down into essential elements such as nitrogen and phosphorus so that plants can absorb them to start the cycle over again. Its entangled litter creates cover and food for larger members of the community: insects, spiders, salamanders, frogs, small mammals and migratory birds. A duffless forest floor can't support spring ephemerals like bellworts, trillium, yellow violets and wild ginger. Instead, exotics such as garlic mustard can muscle in, taking up space and shading out native flowers and tree seedlings

The alien worms work fast. "Ordinarily a tree leaf that falls to the ground in a deciduous forest takes three to five years to decompose and be incorporated into the soil [by microbes and the hyphal filaments of fungi]," Minnesota biologist Steve Mortensen has written. "In forests infested with night crawlers, this process can take as little as four weeks."

Earthworm taxonomist Sam James, a professor at Iowa's Maharishi University of Management, says that until the arrival of European colonists, the continent above the glacial line was worm-free. "When ice sheets covered much of northern North America," he says, "native earthworms were eradicated." The glacial edge runs from Washington State to Long Island, with a southerly dip below the Great Lakes and Ohio

Although native earthworms are found below this line, the innocuous locals, which number 90 or so identified species, still haven't squirmed more than 100 miles north in thousands of years

The invaders came to this continent packed in the soil around potted plants, in ships' ballast or tucked in the hooves of livestock. Aided by their fevered reproductive rate, the official blessing of the U.S. Department of Agriculture and a reputation for results and durability with fishermen, they prospered.

Still, until the past couple of decades, exotic duff-gorging

Unbeknownst to the fisherman, a worm makes a break for it at North Twin Lake in Minnesota. Thus the critters spread.

worms were apparently uncommon in undisturbed forest areas. Back in the 1960s worm expert Gordon Gates (considered by at least one biologist to be the "greatest oligochaetologist who ever lived") was the first to suggest that exotic earthworms were arriving in forests with fishermen who liberated their unused bait.

In a woodlot on the campus of the University of Minnesota, graduate student Cindy Hale pointed to telltale signs of a night crawler earthworm invasion: little piles of worm castings adjacent to "pores" bored into the balding ground. Perhaps these worms escaped from a bucket of ornamental shrubs. Or perhaps they were dumped by a fisherman. Something like this apparently transpired in the Big Woods maple and basswood area of central Minnesota, say the scientists who work there. Now in those places where the night crawlers have appeared with five other smaller exotics, both the ground vegetation and the understory are nearly gone.

There's little doubt that the pattern of these earthworm-damaged forests correlates with fishing, adds Mortensen. "We have found the evidence, a leading edge of cropped-duff radiating out from lakes, boat landings, resorts and other places where people fish." So far, signs of the disappearing duff phenomenon have been documented in selected hardwood forests in Minnesota, Wisconsin, Michigan, New York and Canada.

A tide of exotic earthworms rolls in to the United States every year, meeting the demand of fishermen and gardeners. Canada exports around $20 million worth annually. For the soldiers on the front line—the worm pickers who pull worms from manicured lawns and farmed fields throughout eastern Canada—the work is backbreaking. Yet it brings in quick money.

Inevitably the worm business has attracted hustlers who have decided there is an easier way to get rich on worms. A decade ago in Canada, con artists claimed they had developed an "Asian hybrid" worm especially suited for the angler trade. A starter stock required a "suggested" investment of several thousand dollars, but the market was assured. The promoters promised they'd buy back worms that grew over a certain size. Naturally, few worms measured up. Thus the worm farmers could unload only a fraction of the crop, which the scammers would sell to other "investors."

But the Asian hybrid peddlers didn't bank on the unique talents of Canadian polymath John Reynolds, who has been not only a Ph.D. worm taxonomist but a lawyer and a police inspector. (Reynolds was a university administrator and biology professor until educational cutbacks in the 1980s forced him to switch careers. He sold his worm collection of 100,000 rare squirmers to the Canadian Museum of Nature to pay for law school.) Reynolds led a team of Royal Canadian Mounted Police and the Ontario Provincial Police in an investigation of the scam. "I only had to take one look at the so-called Asian hybrids," he says, and the jig was up. The worms in question couldn't and wouldn't grow to the prescribed length.

Now, Reynolds has retired from law enforcement and has returned to "my first love—worms." Apart from identifying specimens that stump other taxonomists and editing the worm journal *Megadrilogica*, he supports his family by driving an orange 18-wheeler. Armed with his shovel in his cab, he prospects where he can for exotic worms to identify.

As experts have only recently become aware of earthworm depredations, no forest-duff rescue plan is under way. "No one has a clue how we can control them," says Cindy Hale. "This is cutting-edge stuff, and we are only beginning to document the damage."

"Electroshocking or poison are out," says Patrick Bohlen of the Archbold Biological Station in Florida, "because we'd zap everything else." Reintroducing grizzly bears—who apparently savor earthworms—might help, but then some citizens might object. Hiring Canadian worm pickers might make a dent. Skilled workers boast a nightly average of 6,000, and that doesn't take into account the legendary picker who once scored a 22,500-worm night. Hiring foreign labor, however, might open another can of worms with our own pickers: the "grunters" of the Florida Panhandle (SMITHSONIAN, July 1993). We could, of course, head for the garden and the diet of worms that the camp song suggests we eat when no one likes us. "That's as good as anything we can come up with," says Mortensen.

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Turning a New Leaf

EVERY SIX MONTHS SMITHSONIAN HORTICULTURISTS GIVE THE HAUPT GARDEN A MAKEOVER FROM THE ROOTS UP

BY MICHAEL KERNAN

EVERYTHING IS BLOOMING these days in the Enid A. Haupt Garden behind the Castle.

The parterre's geometric patterns are brilliant with masses of orange flowers and arresting foliage. Cascades of red and white blossoms spill from hanging baskets, and the garden's array of urns and planters are filled with all sorts of botanical wonders. Visitors relax on benches or wend their way along the paths, stopping to take pictures, inspect a fetching flower or breathe the fragrant air.

"I met a man who said he couldn't go to work unless he went through the garden first," said Shelley Gaskins, a member of the horticulture team that labors to keep the garden in tip-top shape. "So we need to keep changing it a lot."

A team of horticulturists grade the diamond-shaped beds of the Enid A. Haupt Garden's parterre, preparing them for planting.

A year ago this was a garden in the mind—to be precise, a garden in the minds of head horticulturist Michael Riordan and his colleagues, who right now are already thinking about next year's flowers. The team plants what amounts to a new garden every six months and completely redesigns the parterre about every five years. In addition to the formal parterre, the 4.2-acre Haupt Garden has shady nooks, fountain gardens and other inviting spaces.

With their elaborate designs, parterres remind me of plush decorative carpets. The nice feature about the one in the Haupt Garden is its ever-changing pattern; large diamond shapes and several scallop-shell designs dominate this summer's garden. The ridges of the shells are planted with small, round, greenish blue succulents called echeveria, and a green-and-white slender-leafed calico plant. Orange gazanias define the big diamonds.

"We try to think of unusual combinations of attractive colors and textures," said Meghan Brewer, another horticulturist. "This year the focus is on texture and foliage."

As they dug up the flower beds in late spring, I could tell the winter scene had been gorgeous. There were tulips, heather and more than 3,000 pansies—the workhorse of all winter gardens. Available in a rainbow of colors, these velvety-petaled flowers bloom through mild winters.

"We're always looking for something else for winter," said Riordan, "so often we use a lot of heather. It is hardy, it has an interesting form and it provides weatherproof color."

The pansies were spent, but the gardeners carefully uprooted the heather and placed it on carts to be returned to the Institution's greenhouses; eventually it will be replanted in some other Smithsonian garden.

The summer 2000 look began to take shape in early May, when trucks arrived at the Smithsonian's 11 greenhouses in northwest Washington to pick up hundreds of plants. There, among the vast rows of seedlings, the flowers that the horticulturists had planted several months earlier were coming into their own, ready to be moved to the containers or major beds of the Haupt Garden.

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"It takes a day or two to plant," said Nancy Bechtol, director of the Smithsonian's Horticulture Services Division, "but there's more involved than just putting plants in the ground. When we started managing the garden, the soil here was atrocious. It was 100 percent silt, dredgings from the Potomac, so every chance we get, whenever we open a new bed, we renovate the soil."

"Worms?" I asked.

"Worms," Riordan confirmed. "Worms are like little rototillers. They incorporate organic matter into the soil and help aerate it and improve drainage. A lot of worms were brought in back when the garden was first started, but now we add degraded pine bark to the soil to lighten and loosen it." (For more discussion of worms, see page 29.)

Helping to get the summer garden ready, Shelley Gaskins plants orange gazanias in the parterre.

When the Haupt Garden opened in 1987, the soil's pH was high, up to 8 or 9 for alkalinity. The ideal pH for plants is 6 or 7, and the garden is gradually getting there.

The Haupt fronts Independence Avenue, a busy thoroughfare, and is bordered by the Castle, the Arts and Industries Building and three underground museums. Because it is really a rooftop garden at ground level, built on top of the museums, I wondered if the trees had a hard time growing in soil that is only three feet deep in some places. But I was assured that these tree roots do not grow down so much as out. And the trees are plentiful, enough to block the view of the busy street and help absorb the traffic noise. More than two dozen saucer magnolias, each 20 feet high, line the paths; 15 lindens grace the main entrance; and scattered through the site are holly trees, ginkgoes and weeping beech.

All these lovely growing things complement the paths, fountains and granite sitting areas, but they also camouflage such things as exhaust fans and the two 117-foot-long skylights of the underground museums.

"In the area by the museums, we try to have themes that reflect the Asian and African art they contain," Riordan said. The fountains adjacent to the National Museum of African Art were inspired by the gardens of the Alhambra. "The wall around this fountain has rivulets on top like a Moorish garden, representing the four rivers of paradise, and the bubbling center jet represents paradise itself," he explained. There is also a chadar fountain—a veil of water tumbling down a stone wall. The sight and sound of rushing water makes this one of the Haupt Garden's most popular spots.

Opposite the Arthur M. Sackler Gallery, a museum for Asian art, a moongate motif, borrowed from the Temple of Heaven in Beijing, was created by using large granite circles as gates and seating.

The garden's ornamentation is Victorian: antique cast-iron settees embellished with animal and floral filigree, teak benches, reproductions of 19th-century street lamps, and several urns. The stately iron entrance gates were based on a drawing by James Renwick, Jr., the Castle's architect.

In 1850 Andrew Jackson Downing designed the grounds that eventually became the Mall, in a series of gravel walks and circular carriage drives. The Haupt Garden site is what used to be called the South Yard. American bison were penned here in the late 1880s (SMITHSONIAN, February 2000), and later, a taxidermy facility and an astrophysical observatory were built on the site. In the 1960s it became a parking lot and hangar for the Smithsonian's aviation collection, including an outdoor display of missiles and rockets. Finally, for the country's bicentennial in 1976, a Victorian garden was installed to complement an exposition in the Arts and Industries Building.

In 1982 that garden was dug up for the construction of the underground museum complex. At the time, Secretary S. Dillon Ripley asked his friend and benefactress of horticultural projects, Enid Annenberg Haupt, if she would like to see a new garden there.

Oh yes, she said, but on one condition: "Can you guarantee me that the plants will be magnificent specimens, and the trees will be so large that when I walk into the garden on opening day it will feel like a mature garden? . . . since, you know, Dillon, I am getting on."

She is still with us, as are most of the big trees.

I have forgotten exactly how the earlier Victorian garden looked, but it certainly lacked the diversity of this one.

"It's a 100 percent improvement, hands down," said Bechtol. "It's a lot more interesting to look at today. And it has to be; after all, we handle 30 million visitors a year.

"We want this to be a neat experience no matter what time of year," she continued, "and the experience begins the minute you walk in."

Ms. Slegona has a classroom full of super models.

Go to Cyrene Slegona's 6th grade classroom and you'll find more models than a New York fashion show. Though hers may not be quite as très chic, since they're usually models of bugs, catapults and elevators. Yet, by taking clay, wood, paper and glue and building working models of the things they have been studying in class, Ms. Slegona's students gain a much greater understanding of them than they could ever get from books.

They've not only developed a practical knowledge of subjects like design and engineering, they've also experienced the power of teamwork and their own creative resourcefulness. So in the end, they're not just building better bugs, they're building a better foundation for a life full of learning. Because she's proven to be such a model educator, we're proud to present Cyrene Slegona with State Farm's Good Neighbor Award℠ and to donate $5,000 in her name to be shared by the University of Kansas Monarch Watch program and the Cornish Elementary School in Cornish, Maine.

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SMITHSONIAN

HIGHLIGHTS

When Spanish missionaries arrived in the Americas, they brought the medieval tradition of carving and painting wooden figures of the Catholic saints. Today, these devotional sculptures, or "santos," are an integral part of Latino culture. At right, the earthly father of the Christ child, Saint Joseph, carries a staff of flowers that, according to legend, bloomed miraculously when he first met the Virgin Mary. *Santos: Substance & Soul*, organized by the Smithsonian Center for Materials Research and Education, opens next month, on September 17, in the Arts and Industries Building. The exhibition explores the techniques conservators use to better understand how santos are made, the history of their use and how they can best be preserved.

—Beth Py-Lieberman

The Soul of the Hispanic Santos

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SMITHSONIAN

HIGHLIGHTS

Ed Ruscha

DEFYING CATEGORIES

Among this artist's most recognized works are his images of signs and logos from the early 1960s and his bold, colorful word paintings. In *Annie*, 1962 (opposite), hand-painted typography splashes the name of the well-known comic strip across the canvas. Ed Ruscha (pronounced roo-SHAY) was to the Los Angeles pop art scene what Andy Warhol was to New York's. "Pop artist" was a label that disturbed him. So for a time he ventured beyond painting, pioneering "artist's books" of photographs. Since then he has remained separate from various art trends. Now the Smithsonian's Hirshhorn Museum and Sculpture Garden, in conjunction with the Museum of Modern Art, Oxford, England, has mounted a retrospective of Ruscha's work, declaring him "one of America's most influential and independent contemporary artists." After leaving the Hirshhorn on September 17, the show, entitled "Ed Ruscha" and featuring paintings, drawings and 16 photo-narrative books, will travel to Chicago, Miami, Fort Worth and Oxford.

SMITHSONIAN Website

WWW.SMITHSONIANMAG.SI.EDU

At the magazine's homepage, click on "Events" to go to the calendar and view on-line versions of Smithsonian exhibitions, and the Websites of all the museums. In the on-line gallery, view other images of the carved wooden devotional santos that will be on view in "Santos: Substance & Soul" (p. 36).

Exhibitions and Events

ART NIGHT ON THE MALL

African Art, the Hirshhorn, the Sackler, the Freer and the International Gallery are open until 8 P.M. on Thursdays, through August 31.

SPECIAL HOURS

Through Labor Day, the Natural History Museum will be open until 7:30 P.M. The museum's Atrium Café and the main Museum Store are open daily, 9 A.M. to 7:30 P.M.; the IMAX theater box office is open daily, 9 A.M. to 6:30 P.M. The Air and Space Museum opens at 9:30 A.M. daily, through December 31.

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NATIONAL MUSEUM OF AFRICAN ART

Audible Artworks: Selected African Musical Instruments (through April 8, 2001) Audio stations provide samplings.
Transatlantic Dialogue: Contemporary Art In and Out of Africa (through September 3) Artworks that represent a cultural exchange between African artists and African-American artists.

INTERNATIONAL GALLERY, S. DILLON RIPLEY CENTER

Piano 300: Celebrating Three Centuries of People and Pianos (through June 3, 2001) Features a variety of piano designs dating back to c. 1700.

ARTS AND INDUSTRIES BUILDING

Speak To My Heart: Communities of Faith and Contemporary African-American Life (through September 19) Stories of the church as an agent of unity, education, entrepreneurship and economic development in the nation's black communities.

NATIONAL MUSEUM OF AMERICAN HISTORY

Rube Goldberg: Comic Art and Invention (through October) Pen-and-ink drawings and a model for an alarm clock illustrate the whimsy of maximum effort for minimal results.
An American Diary (through September 4) Small paintings by Roger Shimomura inspired by diary entries made by his grandmother during World War II.
Fast Attacks and Boomers: Submarines in the Cold War Learn about submarines through graphics and interactives.

NATIONAL MUSEUM OF NATURAL HISTORY

Selections from "Forces of Change: A New View of Nature" (through October 9) Photographs from this book examine the geological, environmental and cultural processes shaping our world.
Vikings: The North Atlantic Saga (through August 13) Redefines the year 1000.

Annie, 1962, by Ed Ruscha is on view through September 17 at the Hirshhorn.

NATIONAL AIR AND SPACE MUSEUM

R. G. Smith: The "Old Master" of the Sky (through September 5) The history of flight re-created on canvas.

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HIRSHHORN MUSEUM AND SCULPTURE GARDEN

Directions—Cathy de Monchaux (through October 26) Sculptures in brass, suede, chalk and paper by this British artist.

RENWICK GALLERY, SMITHSONIAN AMERICAN ART MUSEUM

The Art of John Cederquist: Reality of Illusion (through August 20) Thirteen playful, multidimensional pieces.
The Renwick Invitational: Five Women in Craft (through August 20)

NATIONAL POSTAL MUSEUM

Recounting Roosevelt Presentation Albums, 1903-1905 (through February 23, 2001) Albums of stamp die proofs that were presented as favors by President Theodore Roosevelt.

ARTHUR M. SACKLER GALLERY

The Heroic Past: The Persian Book of Kings (through October 29) A legendary Persian poem is the theme of these manuscript illustrations and other works.
Music in the Age of Confucius (through September 17) Earliest and most extensive surviving group of musical instruments from the ancient world.

FREER GALLERY OF ART

Brushing the Past: Later Chinese Calligraphy from the Gift of Robert Hatfield Ellsworth (through January 2, 2001)
The Dragon's Moan (through October 1) Works celebrating the *qin*, or zither.

NATIONAL ZOOLOGICAL PARK

Vanishing Pollinators (through May 2001) Biology teacher Carll Goodpasture's 34 stunning photographs, on view at the Amazonia Science Gallery and the Visitors Center, portray the beauty and grace of flowering plants and their insect pollinators.

GEORGE GUSTAV HEYE CENTER, NATIONAL MUSEUM OF THE AMERICAN INDIAN [NEW YORK CITY]

Reservation X: The Power of Place (through August 20) Native artists from Canada and the United States explore life in their community and in mainstream society.

COOPER-HEWITT, NATIONAL DESIGN MUSEUM [NEW YORK CITY]

National Design Triennial: Design Culture Now (through August 6) A critical look at leading developments.

CLOSED FOR RENOVATIONS

The Smithsonian American Art Museum and the National Portrait Gallery are closed for the next three years. The Anacostia Museum Gallery reopens next spring.

Planning a Smithsonian Visit?

To receive a free Associates' planning packet, write to Smithsonian Information, Smithsonian Institution, Washington, D.C. 20560-0010, or send your request via e-mail to info@info.si.edu, or call 202-357-2700 (voice) or 202-357-1729 (TTY), 9 A.M.-5 P.M., Monday-Friday; 10 A.M.-4 P.M., Saturday-Sunday, or visit www.si.edu. Note: Museums are generally open 10 A.M.-5:30 P.M. daily, except December 25. Parking is limited; Metrorail is convenient to most museums.

THE CASTLE—INFORMATION CENTER

Upon arrival make your first stop the Castle's Smithsonian Information Center. At the Associates' Reception Desk, open 9 A.M.-4 P.M. daily, learn what's new at the Smithsonian and about other area attractions. Receive special Associates' materials, hear about your discount privileges and register for a Sunday morning "Behind-the-Scenes" member's tour of the Castle.

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Petar Princip lights a candle next to a portrait of his cousin Gavrilo Princip, whose memory has been obscured by ethnic conflict.

EIGHTY-SIX YEARS AGO THE SERBIAN TEENAGER SHOT AN ARCHDUKE AND SET EUROPE ON THE ROAD TO WORLD WAR I. TODAY HE IS ALL BUT FORGOTTEN

for Gavrilo Princip

BY DAVID DEVOSS ◆ PHOTOGRAPHS BY MANFRED HORVATH

THE WANING LIGHT OF AUTUMN FLOWED THROUGH THE DOUBLE-PANED WINDOWS, enveloped the silvery mane of the aging historian, then puddled softly atop a pile of sepia prints strewn across his desk. "This is a picture of the monument Austria erected to the memory of Franz Ferdinand after the assassination," said Sarajevo municipal councilman Borislav Spasojevic, carefully extracting a hand-painted postcard from the stack of fraying images. "Of course, it's no longer there," he smiled. "It was taken down about the time the museum commemorating Gavrilo Princip and the Young Bosnia movement opened across the street. Now that's gone, too, replaced by . . . " Spasojevic sighed, allowing his silence to complete the thought.

"Sarajevo is the vortex of an accursed meridian that witnessed the death of three empires," he concluded with a wave of his hand. "But you'll find few tangible reminders here of the event that changed the world."

I had arrived in Bosnia several months before, knowing little about Sarajevo except that it had hosted the 1984 Winter Olympics and had withstood a devastating 1992-95 siege involving Bosnian Serb besiegers and Bosnian Muslim defenders in which 10,000 citizens had died before the defenders, with help from Western Europe and the United States, prevailed over their mainly Serb enemies. War with forces from neighboring Croatia had further devastated the region. After excruciating negotiations, Bosnia and Herzegovina had been created out of part of what had been multiethnic Yugoslavia, with now mainly Muslim Sarajevo as its principal city and the remaining Serbs a beleaguered minority.

I also knew that these ethnic passions were nothing new in the Balkans, where such conflicts have been the rule for centuries. Sarajevo was the place where, on June 28, 1914, a 19-year-old Serb nationalist named Gavrilo Princip shot Austrian archduke Franz Ferdinand, heir to the throne of the Austro-Hungarian Empire, then suzerain of all of what would later become Yugoslavia.

One of my first priorities upon arriving in Sarajevo was to find the famous corner where the assassination had occurred, but after several false starts, I realized that Gavrilo Princip, a national hero prior to Yugoslavia's early 1990s' disintegration into warring factions, was now considered a criminal terrorist by Bosnia. Not only was the Princip museum closed but all traces of its name had been sandblasted from the exterior. Gone, too, were the concrete-embedded footprints marking the spot where Princip stood when he fired the fatal bullets. Even finding the site of the assassination was difficult, since officials had changed street names and removed all historical markers pertaining to the event. "The assassination is a very sensitive topic," advised Sarajevo University professor Kemal Bakarsic. "It will be difficult to find people willing to talk candidly about Gavrilo Princip."

"It will be difficult to find people who are willing to talk candidly about Gavrilo Princip."

The assassination was one of the defining moments of the 20th century. One month after Franz Ferdinand's death, Austria declared war on Serbia after the Serbs rejected an impossible Austrian ultimatum. The announcement prompted Russia's Czar Nicholas II to come to the aid of his fellow Slavs in Serbia. Two days later, Germany's Kaiser Wilhelm sent a "Dear Niki" memo to Moscow imploring him to recall his troops. If war breaks out, German diplomat Arthur Zimmerman told a worried British ambassador, it will be the fault of "this damned system of alliances . . . the curse of modern times."

But Europe's iron dice already had started to roll. When Russian ally France ordered a general mobilization the following day, Germany rallied to Austria's defense and declared war on Russia. Forty-eight hours later, Berlin declared war on France and sent its troops into Belgium. This forced Britain, bound by treaty to defend Belgian neutrality, into the war and prompted anti-Russian Turkey to side with Austria and Germany.

The ensuing Great War cost the lives of 8.6 million combatants and 6.5 million civilians. By the end of 1918, more than a generation of Europe's best lay dead in the trenches. The Austrian Empire was in shambles, the Ottoman Turks had retreated to Anatolia and the last of the ruling Romanovs of Russia lay buried in an Ekaterinburg grave.

As I walked out of the faded colonial building where Spasojevic's office was located, the old man's last words echoed like a melancholy refrain: "In the Balkans, history often is destroyed, or hidden away pending further interpretation."

The muddy Miljacka River runs through the center of Sarajevo like a crimson scar. It was here on the quay, alongside a strand of belle epoque buildings, that the archduke and his Czech wife, Sophie Chotek von Chotkowa und Wognin, died. The question historians never have answered successfully, however, is why the royal couple tempted fate by coming to Sarajevo at this time. Yes, Franz Ferdinand was Inspector General of the Austrian Army, and yes, he had been asked by Bosnia's colonial governor, Gen. Oskar Potiorek, to review a military exercise.

But why invite the Habsburg heir to the empire's most rebellious province? Especially when only the month before, Serbian Prime Minister Nikola Pasic had asked his minis-

Immediately after the assassination of Franz Ferdinand and his wife, Sophie (opposite), police arrest Ferdinand Behr, a bystander who assisted gunman Gavrilo Princip.

HULTON GETTY

ter in Vienna to warn Austria about the possibility of an assassination attempt. Even Franz Ferdinand's closest advisers said the trip was needlessly provocative. After all, June 28 was St. Vitus Day, Vidovdan, the Orthodox holiday during which Serbs paused to commemorate their 1389 defeat by the Ottoman Turks at Kosovo and celebrate the memory of Serb nobleman Milos Obilic, who, following the battle, crept into the sultan's tent and stabbed him to death before being hacked to bits by the Ottoman guards.

It had taken Serbia almost 500 years to regain full independence from the Turks, who left an enduring legacy in the Balkan's Muslim population. Freshly victorious in two Balkan wars, Serbia was on the rise. And all of the resentment engendered by centuries of Muslim occupation was directed at Vienna, seat of the Austro-Hungarian rulers, seen by Serbs as but the latest oppressors. Yet, despite the apparent danger, Franz Ferdinand accepted the invitation to visit the turbulent region German chancellor Otto von Bismarck had earlier proclaimed not worth "the bones of a single Pomeranian grenadier."

THE HABSBURG'S UNRULY EMPIRE

THE EARLY 20TH CENTURY WAS NOT A good time for authority figures. During the first 13 years of the new century there had been some 40 political assassinations around the world.

Of all Europe's rulers, none were more vulnerable than the Habsburgs. Started by a minor German count who was elected Holy Roman Emperor in 1273, the family had ruled in Central Europe for more than six centuries. During that time, it had twice driven back Turkish invasions of Central Europe. The Holy Roman Empire had become the Austrian Empire, encompassing eight nationalities, 17 provinces, 20 parliamentary bodies and a variety of cultures that extended more than eight degrees of latitude across the map of Europe. But under the leadership of Emperor Franz Josef, the empire had suffered reverses and faced internal threats.

In 1867 Franz Josef saved the empire with a compromise, proposing that Austria and Hungary become separate sovereign states under one ruler who would be called Emperor of Austria and King of Hungary.

The real threat to Austrian hegemony in the region, however, came not from rivalries among the Central European and Balkan states but from dozens of secret societies, the most notorious of which was the Black Hand. A Serbian nationalist cult, the group was lead by Maj. Dragutin Dimitrijevic, a rogue nationalist nicknamed Apis after the bull-god of ancient Egypt. Dimitrijevic developed a talent for assassination in 1903 when he helped plan and execute the murder of Serbia's King Alexander Obrenovic and Queen Draga. Now he was prepared to strike again, but instead of employing disgruntled army officers, this time his assassins would be idealistic schoolboys.

For decades the mountains of Bosnia had been a breeding ground for discontent. Serb peasants there were bound by a feudal system that forced them to surrender one-third of their harvest to Bosnian Muslim landlords. Abandoned to their poverty, Bosnia's embittered Serbs turned inward, seeking inspiration from the heroic songs of wandering balladeers called *guslas* and instruction from nationalistic Orthodox priests.

Curator in a Sarajevo museum, Bajro Gec stands among mementos of the assassination, items he saved from destruction during the 1992 war between the Serbs and Muslims.

Young men flocked to secret societies. Drawn to Serbia in hopes of finding ways to support its causes in the Balkans, many found their way to the Black Hand. The group eventually recruited six Bosnians, one of them Gavrilo Princip, and sent them back home across the Drina River to Sarajevo, armed with bombs and revolvers.

On the morning of June 28, Franz Ferdinand and Sophie arrived early by train from the resort town of Ilidza, where they had spent the night in an ersatz Tyrolean spa called the Hotel Bosna. As they climbed into the Graef und Stift touring car that would carry them to Sarajevo's city hall, both were in a good mood.

Although Sophie's family, the Choteks, were one of the oldest aristocratic families in Bohemia, they were considered commoners under the Habsburg Family Law. After repeated entreaties, Franz Josef agreed in 1900 to allow the couple to marry, but only after Franz Ferdinand formally agreed to a morganatic union that would prevent Sophie from becoming Empress of Austria and forever bar their children from the throne. According to the terms of the renunciation, Sophie could not sit beside her husband in a court carriage, appear at his side in the royal box at the opera or be buried in the Habsburg family crypt. Even after 14 years of marriage and three children, she ranked below the youngest archduchess when in Vienna. But outside Austria, in lands administered by the military, things were different. On this glorious summer day in Sarajevo, the Duchess of Hohenberg finally would receive all of the imperial honors due the wife of the heir apparent.

But first the royal couple had to pass through the gauntlet of six zealous assassins. Their car was only a third of the way down Appel Quay when Nedeljko Cabrinovic threw the first grenade. But the archduke's

Franz Ferdinand's bloodstained tunic and the Graef und Stift touring car in which he and his wife were shot are among articles preserved in a Vienna museum.

chauffeur sped up, and instead of landing in the car, the grenade bounced off and exploded under the trailing vehicle, wounding about 20 people. The archduke's car roared past Gavrilo Princip toward the faux Moorish city hall.

Transformed later into the national library, Sarajevo's old city hall today stands gutted and silent, a ghostly victim of Serb incendiary bombs fired in the spring of 1992. Behind its graffiti-covered walls lie the cinders of 700,000 books. But when the royal couple pulled in front of the crenellated structure 86 years ago, the municipal officials were oblivious to the attempted assassination. Sarajevo's Lord Mayor greeted Franz Ferdinand effusively with a prepared text. "Our hearts are full of happiness on the occasion of the most gracious visit with which your Highnesses have deigned to honor the capital of our land. . . . "

"Herr Bürgermeister," the archduke interrupted, "what is the good of your speeches? I come to Sarajevo on a friendly visit and someone throws a bomb at me. This is outrageous."

The archduke's outrage should have been directed at Gen. Oskar Potiorek, who had taken almost no precautions. Despite the rumblings of trouble, only 120 policemen were on duty that day.

Instead of asking Franz Ferdinand and his wife to remain inside the city hall until soldiers could arrive to escort them to safety, Potiorek's solution to the lapse in security was to change the motorcade's prearranged route. Instead of winding through the narrow streets of the Bascarsija Turkish quarter, he proposed the royal couple return the way they came, along the Quay road, a broader, straighter street where the car could travel more rapidly.

DEATH COMES FOR THE ARCHDUKE

AS THE ROYAL PARTY GOT BACK IN the car, the situation seemed under control. Grenade thrower Cabrinovic was in custody. Four of the other would-be assassins, several of whom had no stomach for killing, had abandoned their posts. Only Gavrilo Princip remained. But he was positioned around a corner, along the route that had been published in the morning's papers.

Flanked by curious bystanders, the procession returned along the river, but instead of speeding through the Bascarsija intersection, the cars turned right. Potiorek had forgotten to tell the chauffeurs of the change in plans. When he realized what was happening, Potiorek ordered Franz Ferdinand's car to halt and back up. But the archduke now was only three steps from Princip, and while the driver fumbled with the car's cumbersome gears, Princip, the man considered too timid to be given a bomb, pulled a .38 Browning pistol from his pocket and stepped forward.

The two men who faced each other were emblematic of the age; one a disdainful aristocrat with an inverted hussar's mustache and plumed hat, the other a romantic teenage nationalist hoping to gain immortality. Princip fired two shots. The first tore through the side of the car and penetrated Sophie's corset. The second pierced the neck of Franz Ferdinand's powder-blue tunic, severing the jugular vein before lodging against his spine.

What kind of man was Gavrilo Princip? The corner where the attack occurred reveals no clues. But four blocks away, up a grimy stairway in a small apartment behind the shuttered Serb Orthodox Cathedral, lives a woman with memories of the past.

"I was only 11 when Gavrilo shot the archduke, but I knew his girlfriend Jelena Milisic when we were

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be bullish **Merrill Lynch**

"I was only 11 when Gavrilo shot the archduke, but I knew his girlfriend."

both teachers at Sarajevo's primer gymnasium (academic high school) in 1946," smiles 97-year-old Lubica Tuta. "Jelena and the art history teacher, Borislav Mihacevic, were Young Bosnia revolutionaries with Gavrilo. Boro used to tease Jelena about spending the night with Gavrilo in the park across the river from where the attack occurred. Gavrilo desperately wanted to make love, but Jelena said no. Even when he told her he probably would die the following morning, she wouldn't relent. Boro said Gavrilo was so angry the morning of June 28 that he would have shot God himself."

Today, despite two world wars, a half-century of socialism and a bloody siege lasting more than a thousand days, downtown Sarajevo still has the look of a small Austrian town. The bond between Vienna and its former colony remains strong, in part because for nearly a century every deserving Bosnian student could apply for a university scholarship in Austria. There even is talk of restoring the monument to Franz Ferdinand and Sophie that was demolished at the end of World War I. Until that day comes, however, Sarajevo's Austrian artifacts will stay locked in the basement of the National Art Gallery.

"Politicians believe these works are controversial, so we keep them hidden away," says gallery director Seid Hasanefendic, as he descends a narrow stairway into the clammy bowels of the building and unlocks a heavy door. Edging past jumbles of artifacts, his breath misting in the chill, he finally arrives at another door, which opens into a small chamber where the busts of forgotten monarchs peer through discolored tarpaulins.

In the corner is a life-size statue of Franz Josef, his imperious glare stone-cold and covered with dust. Resting on a stack of old newspapers is all that remains of Austria's assassination monument: a bas-relief bronze plaque bearing the profiles of Franz Ferdinand and Sophie.

"The Yugoslav Army declared war on history when it began shelling Sarajevo in 1992," says Hasanefendic. "They destroyed the national library and hit this building with 50 bombs, but we survived. The irony is that our politicians now are afraid to exhibit these faded symbols of power."

Outside the gallery still swathed in protective scaffolding, I walked across Zelenih Beretki Street to the public square where students from the nearby law faculty were enjoying the afternoon sun and tiny cups of Turkish coffee. Was it possible that the history of Gavrilo Princip and the event that sparked World War I was not lost or destroyed, but merely hidden away? I had heard stories of what transpired late in the summer of 1992 when Serb snipers and artillery began pounding Sarajevo. As the death toll mounted, citizens frustrated by their helplessness began attacking symbols of the former Yugoslavia. First on their list was the Princip museum. Though many items were stolen or smashed, the bulk of the collection was saved, I was told, by a courageous curator named Bajro Gec, who literally lived inside the battered museum for more than two years, protecting with his life the priceless photographs and period costumes from vandals and thieves.

But where was Gec? Finding a person can be difficult in Sarajevo, which has no money for telephone directories and a municipal government that considers everything an official secret. Fortunately, Austrian ambassador Valentin Insko had met Gec when the embassy had inquired about restoring the Franz Ferdinand memorial. "Try the Jewish Museum," Insko advised. "You may find him there."

Located on the western edge of Bascarsija, the Jewish Museum, now known as the Museum of Sarajevo,

Gavrilo Princip sits in the center of the first row in this photograph of the trial of the assassination plotters. Princip told the court he was sorry only for the death of Sophie.

ARCHIVE PHOTOS

At St. Mark's Cemetery in Sarajevo, burial place of Princip and several other plotters, the Serbian Orthodox community erected a chapel and monument.

does not appear as a museum on any city map. Built as a synagogue in the 16th century, the building has no identifying markings and turns away any tourist who might wander across its cobbled courtyard to bang on the rusted metal door. "How can we open to the public when we have no money?" asks museum director Mevlida Serdarevic, with a hint of desperation.

"I can show you where the Princip collection is located, but only Bajro has the key to get inside," she says, walking down a wooden stairway into a vaulted chamber in which an enormous book containing the names of every Sarajevo Jew killed during World War II hangs suspended by a chain from the ceiling. Our arrival prompts a chorus of coughs from six people who sit shivering at their desks. "Every employee here has the flu, but the cold is good for the antiques because it keeps away the bugs," she explains. Walking down another flight of stairs, we arrive in what appears to be Europe's basement, a room filled with gilded sabers, Orthodox iconography, broken spinning wheels and oil portraits of Turkish pashas. It's as if every decade of the past century has deposited its fading grandeur here before embracing the next new fad.

HIDDEN HISTORY

"THE PRINCIP EXHIBITS ARE OVER there, but we mustn't go closer without Bajro Gec," cautions Serdarevic Why doesn't the director of a museum have access to all its exhibits, I wonder? "Can you imagine the bravery it took to transfer these items amid the chaos of a city under siege?" she responds. "Bajro Gec saved the history of Gavrilo Princip, and now it is his to show."

While waiting for Gec to return, I walked down Sarajevo's main boulevard, Marsala Tita, looking at the coffee bars and cake shops that were full even in the middle of the afternoon. There is no better metaphor for the Balkan's historical ambivalence than Marsala Tita. A century ago the street was called Cemalusa, after a Turkish feudal landlord. After World War I, when Bosnia was incorporated into the Yugoslavian monarchy, the name changed again to King Alexander Street. During the Nazi occupation, it was christened Adolf Hitler Street. When communist partisans finally liberated the city, the tree-lined avenue was renamed after their leader, Josip Broz Tito.

It was Tito who turned Gavrilo Princip into a national icon. In Gavrilo's anticolonialism, communist hagiographers detected the first stirrings of socialism. In 1953 the government opened the Princip museum in Sara-

jevo. Eleven years later it proclaimed the family's refurbished peasant shack a national landmark. If Bosnian Muslims or Croats objected to the deification of an Orthodox Serb, they wisely kept silent.

When I return to the shuttered museum, Bajro Gec escorts me down to the basement, where two large wooden trunks secured by enormous padlocks sit beneath barred windows. After opening the locks with an iron key, he slowly lifts one of the lids as the hinges shriek in protest. "Here are the clothes Princip wore when he was arrested," says Gec, holding up a black wool suit with tarnished metal buttons. Layered deeper in the trunk are Austrian military uniforms, a beaded corselette belonging to Princip's mother, Maria, and a dress identical to the one Sophie Chotek selected for St. Vitus Day. Strewn throughout the pile of musty clothes are old shoes, tattered newspaper articles and black-and-white photographs curling with age in which young conspirators affect regal poses while staring stiffly at the camera.

The most famous photograph shows Princip and his fellow revolutionaries at their trial, staring indifferently at their inquisitors. There were 25 defendants in all. At the end of the trial the presiding judge asked all of the accused to stand up if they felt sorry for their act. All stood except Princip. When asked why he did not rise, Princip responded that he was sorry for the children who had lost their parents, and he was especially sorry for killing Duchess Sophie. The bullet that hit her was intended for Gen. Potiorek, he explained. "As far as suggestions are concerned that somebody talked us into committing the assassination, that is not true," Princip said. "The idea for the assassination grew among us and we realized it. We loved our people."

Five days later the judges returned with their verdicts. Nine of the accused were set free, five were sentenced to be hanged, while the remainder received prison terms ranging from three years to life. Since Princip was 19 at the time of the assassination, he could not be hanged under Austrian law. He was sentenced to 20 years at hard labor with the proviso that every June 28 he remain in a darkened cell without food or a mattress.

PROUD TO BE A PRINCIP

"POLITICIANS WANT TO FORGET PRINcip because he was a Serb," says Gec. "I've always thought of Sarajevo as the Jerusalem of Europe, a place where different cultures can come together. But if we refuse to recognize our history and refuse to restore our monuments, it will be difficult to keep Sarajevo a multinational city."

A more immediate problem for Gec, however, is the rapid disintegration of the items he has been able to salvage. "The temperature and humidity make preservation almost impossible. Our staff managed to save these items from Belgrade artillery, but now we're losing them to mildew."

Not all of the history from 1914 has been lost or locked away. The Hotel Bosna where Franz Ferdinand and his wife spent their last night has survived two wars and the breakup of Yugoslavia, albeit in a form no Habsburg would recognize. Encircled by razor wire, microwave dishes and sandbag revetments, the former royal residence now serves as headquarters for the NATO-led forces in Bosnia. The building groans under the weight of too much history.

The respect that eluded the archduke and duchess in life also escaped them in death. Because Sophie was not a Habsburg, the funeral service in Vienna was perfunctory. Only the three children of the imperial family sent flowers. To minimize public expressions of sympathy, Franz

Josef's chamberlain ordered their coffins transported only at night, and he would have succeeded in having them buried separately had not Franz Ferdinand left specific instructions that he was to be buried alongside his wife at their family home in Artstetten.

But Franz Ferdinand's death was more enviable than the life that faced Gavrilo Princip. He was taken to Theresienstadt, an old Bohemian fortress north of Prague that had been converted into a military prison and later would serve as a Jewish concen-

SFOR (Stablization Forces) soldiers guard Sarajevo's Lateiner Bridge in 1999. Once named for Princip, the bridge abuts the scene of his momentous crime.

tration camp during World War II. Chained with shackles weighing 22 pounds, the 145-pound prisoner was kept in solitary confinement in an unheated cell. Tuberculosis consumed him, and on April 28, 1918, Princip died weighing 88 pounds.

Fearing his bones might become relics, Princip's Austrian jailers took the body in secret to an unmarked grave, but a Czech soldier assigned to the burial detail made a map, and in 1920 Princip and the other "Heroes of Vidovdan" were disinterred and brought to Sarajevo, where they were buried together beneath a chapel "built to commemorate for eternity our Serb Heroes" at St. Mark's Cemetery.

For the Heroes of Vidovdan, however, eternity ended with the breakup of Yugoslavia. St. Mark's today is in practice ignored by Sarajevo officialdom. Visitors are discouraged by a locked gate, weed-choked pathways and packs of scrofulous dogs that feed on the heads of sheep thrown at the chapel by butchers at a nearby market.

Shortly before his departure to Theresienstadt, Princip was told that the war he had started, to free all South Slavs, was, in fact, consuming them. Although Belgrade had fallen to Austrian troops, he remained positive. "Serbia may be invaded but not conquered," he told one of his German guards. "Serbia will one day create Yugoslavia, mother of all South Slavs."

Today Yugoslavia is a country in name only. Slovenia, Croatia and Macedonia are independent states. The province of Kosovo is a UN protectorate and Bosnia is, in fact if not officially, divided into two entities—one Serb, the other Muslim—each with its own parliament, police and army. The Grahovo Valley home where Gavrilo grew up lies in ruins, destroyed by Croat troops in 1995, four months before the Dayton Peace Accords ended the war in Bosnia.

No longer are bridges, barracks and schools named after Gavrilo Princip. But his memory still is revered by Petar Princip, 61, the family's last direct descendant in Bosnia, who lives with his wife, Dusanka, in the Serb city of Banja Luka. Permanently dressed in black for their son Danilo, who died fighting the Croats, the Princips have turned their apartment into a shrine, of sorts, dominated by a portrait of Gavrilo at age 18.

"People say he was a crazy terrorist, but Gavrilo was a schoolboy from an educated family," says Petar, a botanist who harvests herbs from the forest. "Mine was a respected family," he adds, as his wife lights a candle beneath the large portrait of Gavrilo. "My cousin was the liberator of the Slav people. But now I've lost my home, my son and the respect I once enjoyed. I'm proud to be a Princip, but I'm also sad to be part of a forgotten history."

Los Angeles journalist David DeVoss lived in Bosnia for more than a year. Photographer Manfred Horvath lives in Vienna, Austria.

Something's fishy about this Robot

When it comes to speed and maneuverability, fish leave man-made submersibles floundering, but RoboTuna and friends may change all that

BEFORE BEGINNING THE DAY'S WORK, ROBOTuna II must go through a set of calisthenics. It's a brief exercise, to be sure, with just a slight turn of the tuna's head, a nearly imperceptible flex of the midsection and a mere suggestion of a tail sweep. But that's enough to move the joints, test the cables and calibrate the sensors. With this little wriggle, RoboTuna II, a four-foot-long "biomimetic" Atlantic bluefin tuna, is ready to make a series of 60-foot runs at the Department of Ocean Engineering Testing Tank Facility at the Massachusetts Institute of Technology.

David Beal, a researcher in the RoboTuna Project and one of the two builders of RoboTuna II, hurries off to the computer room. He keys in a command, and RoboTuna II backs up to the far end of the tank, like a runner getting into the blocks. The fish doesn't swim on its own—it is suspended from a control carriage that moves on roller skate wheels and contains motors and various sensors plus a video camera pointed toward the water. For this run, co-builder Michael Sachinis walks alongside, observing the fish and the stability of the camera mount. He keeps an eye on a six-inch cylinder at the front of the carriage that stirs up the water in front of the swimming fish and creates vortices, or eddies. Those vortices are an important focus of the research going on here.

"We are trying to make this fish learn how to read the vortices in order to unlock the secrets of how fish swim," Beal says. The ability to "read" will come through pressure sensors running along the fish's side and that approximate, biomimetically (imitating nature), a real fish's lateral line. This marvelous sensing mechanism in real fish can detect minute pressure fluctuations that may signal the presence of vortices caused by nearby predators or obstacles. The synthetic lateral line that Sachinis has installed in RoboTuna II is so sensitive that it can detect the pressure difference of a single centimeter in depth.

"We're giving the robofish a little bit of intelligence so it can adapt to its surroundings," Beal says. With a synthetic lateral line, he explains, a robotic fish might one day maneuver better in a current. An autonomous underwater vehicle equipped with such intelligence might maneuver more precisely in the ocean, more like a fish. This ability to read and react to its environment, which

BY DOUGLAS WHYNOTT ■ PHOTOGRAPHS BY PETER MENZEL

Although the ultimate goal is for robotic fish to be able to mimic nature, MIT's RoboPike still needs a little human help in order to jump out of the water.

A time exposure of RoboTuna II swimming in the towing tank (top) shows the motion of the tail. Michael Sachinis, above left, attaches a dorsal fin as Dave Beal checks on the Lycra skin.

the biological fish has but the biomimetic robot as yet does not, is something Beal and Sachinis call "vorticity control."

"Ready?" Beal calls out from the computer room door.

"Ready!" Sachinis answers from the far end of the tank.

The control carriage begins to move, a small wake forms and RoboTuna II swims down the towing tank at 27 inches per second. A stream of dye trails from the cylinder into the water and swirls by the fish. Sachinis paces along with the anxiousness of an animal trainer; the quality of his research will depend on the performance of this creature. The run takes about a half minute. Sachinis rushes off for a look at the imagery captured from this robotic event.

The picture shows the fish's head, seen from above, turbulence in the water, and a whorl of tea-colored fluid. It's a promising image, but the whorl is not yet distinct enough for transfer to a computer for analysis. On the next run they'll put a bit more dye in the water and turn on ultraviolet lights. RoboTuna II backs up, pauses and surges ahead again.

In this long and narrow basement room, with its 6-foot wide-by-100-foot-long tank, are some artifacts of RoboTuna II's lineage. Workbenches run along the wall, and on one of them, poised in a clamp, is Charlie, the first RoboTuna. This father of MIT's robotic fish is about to travel to London for a visit to the Science Museum. RoboTuna I looks as if it has been filleted. One side is laid open so that the ribs, joints, gears and cables are visible. The other side is intact, still wearing its foam covering and the striking striped Lycra skin that doesn't look fishlike at all but seems artistic and perfectly appropriate for this creation.

The RoboTuna Project began in the summer of 1989, when Michael Triantafyllou, a professor of ocean engineering at MIT, met with Mark Grosenbaugh and other researchers at the Woods Hole Oceanographic Institution. Why, they wondered, hadn't any useful technologies been developed from studies of how fish swim? The ocean engineering industry had come to a point where it needed to develop research vessels that were safer and more economical. Standard designs had limitations. The shapes of a submarine and its propeller were about as efficient as they were going to get. Autonomous underwater vehicles were powered by batteries that not only take up a great deal of space but carry power for just a few hours.

Improvements could follow different pathways. One might be to improve battery power, such as the development of radical fuel cells that might convert kelp or shrimp

Gray showed that a dolphin has only one-seventh the muscle power it needs to swim as fast as it does.

into energy. Or the effort could go into making fundamentally different and efficient propulsion systems such as those used by fish. Though fish move in a medium 800 times denser than air, they are capable of swimming in powerful bursts at more than 40 miles per hour and of making 180-degree turns in a distance equal to the length of their bodies. Ships need about ten times their length to reverse direction and have to cut their speed in half. With that in mind, Triantafyllou and his collaborators, Grosenbaugh from Woods Hole, Dick Yue from MIT and George Triantafyllou (Michael's brother, who is also an ocean engineer) from the City College of New York, decided to study the principles of fish propulsion for the purpose of adapting them to man-made designs. Building a fish was beyond the grasp of contemporary robotics technology, but they thought it was worth trying for the discoveries it might bring.

One motivating factor in Triantafyllou's research, and the development of the RoboTuna Project, was a long-standing scientific problem called Gray's Paradox. The paradox had tantalized scientists since 1936, when zoologist James Gray showed that a dolphin has only one-seventh the muscle power it needs to swim as fast as it does. The mystery that Gray's Paradox created was: Where did the efficiency come from? What mechanisms do fish possess that allow them to move so well and go so far on so little power?

Any object in flowing water will cause a trail of eddies. The team wondered if fish might be using the vortices to move more efficiently. First they constructed some "foils" similar to fish tails and studied how they interacted with vortices. Then, in 1995, construction began on a robotic fish. For their model the team chose the Atlantic bluefin tuna, *Thunnus thynnus*, a highly migratory species that can easily traverse the entire Atlantic and can reach estimated speeds of 40 miles per hour. The tuna also has a somewhat rigid body and swims by oscillating its tail, the "thunniform mode," a style that would be conducive to replication in the lab.

David Barrett, then a Ph.D. candidate studying both ocean engineering and robotics at MIT, designed and built RoboTuna I. "At a fish market in Cambridge, we bought a tuna, did autopsies and studied how the creature worked. We tried to rebuild a tuna, following the master designer, which is nature." Barrett called it "reverse engineering."

Barrett constructed a robot with a stainless steel spine of eight vertebrae, each connected with low-friction ball-bearing joints. The spine was flexed by means of pulleys and cables driven by small electric motors mounted outside the fish on a control carriage. The cables were equivalent to tendons, and the motors to muscles. Steel spines mounted with plastic ribs were attached to the vertebrae. This "flexible hull" was covered with a thin layer of foam rubber—the fish's flesh—and over that went a Lycra sock for the skin. The fish was suspended from the control carriage by a hollow streamlined mast through which ran the cables and sensor wires. There was a controller for the movement of the carriage and another for the fish, with a single data collection system. The total cost of construction was about $30,000.

The next task was more difficult: RoboTuna had to be taught how to swim. The possibilities of the wavelike movement of an eight-jointed spine were nearly infinite. As David Barrett put it, "There are 287 trillion possibilities of different ways a fish can swim. It would take too long to work them all out, so we asked, 'How does Mother Nature do this?'"

The answer was evolution, which in the fish's case took several hundred million years. Barrett used a mathematical theory called genetic algorithm, which simulates evolution. He loaded each swimming possibility into a "chromosome." The fish swam down the tank dozens of times, each time programmed with a different set of chromosomes. In 20 runs, the 10 best swimming possibilities were moved on to the next cycle. "Just as in nature, the fish that swam well could survive and produce offspring. The poor performers were retired. If the fish's tail could push, in the next generation, all tails pushed." Barrett estimated, "We

SAM OGDEN

A trail of clockwise and counterclockwise vortices that RoboTuna I has made by swinging its tail from side to side are visible here with the help of dye. The manipulation of vortices that they produce and those they encounter makes fish efficient swimmers.

compressed 2,057 years of research into a single summer. It was amazing. We were watching evolution."

Once RoboTuna was swimming in peak form, Triantafyllou and his group began to analyze the play of water about the fish. What they saw was a creature capable of vorticity control.

When a boat is moving, the water it encounters rolls and spins along the hull, forming vortices that spin clockwise on one side of the hull, counterclockwise on the other, dragging along each side of the boat and slowing it down. That drag is compensated for by the boat's propellers, which create opposing vortices strong enough to move the boat. It's an inefficient mechanism, but it's the best we have. When a fish swims, it also creates vortices that spin along its body. Unlike a ship, a fish flexes its body, and in doing so, it manipulates those vortices so that they are no longer a drag. Through the lateral motion of its body, "the fish rolls the vortices down its sides," Michael Triantafyllou said, "and pushes them sideways and down with its tail. The tail kicks the vortices." In this way the fish moves the vortices to its opposite side, and a potentially wasted energy is turned into a propulsive force—the fish can turn drag vortices into propulsive vortices.

Sudden, propulsive bursts by a fish at rest are achieved when it sweeps its tail to generate first a rotating and then a counter-rotating vortex. Pushing the vortices together creates a strong jet of water, and the fish springs off it. This takes about a millisecond, Triantafyllou said. As he poetically describes it, "the fish flexes its way through the vortical stream. It took them a few hundred million years to evolve this ability."

Though RoboTuna falls far short of the real biological creature, the robotic fish did reveal some of the basic mechanisms of how fish swim. As David Barrett summed it up, "RoboTuna proved that a nonbiological flexible-hulled vehicle can be made to reduce massive drag and turn it into propulsion. This addressed the phenomenon in Gray's Paradox."

But did the work with RoboTuna solve this riddle that has puzzled scientists for six decades? Emphatically no, Michael Triantafyllou said. "That's a very controversial subject. We are not biologists, and there are many biological uncertainties that we cannot claim to have solved. But we now have a pretty good understanding of the hydrodynamics of how fish swim. Because of RoboTuna, there's now an accepted understanding of this."

David Barrett, builder of RoboTuna I, admires the prototype, on display at MIT with an early autonomous underwater vehicle, below, from 1973.

The RoboTuna Project spawned other biomimetic fish. A direct offspring of RoboTuna at MIT is a free-swimming fish built by graduate student John Kumph called "RoboPike," 32-inches long and modeled on a chain pickerel. Unlike RoboTuna, which swims by tail oscillations, RoboPike swims by flexing its body back and forth, the "carangiform mode." The body is made of fiberglass spirals and flexed by means of model airplane motors.

Studies of RoboPike brought discoveries of how a fish turns so quickly. Flexing its body into a C-shape, the fish creates a pair of counter-rotating vortices on the inner part of the curve. The vortices move toward the rear, and the fish, using its tail, pushes off them, essentially creating a springboard from which it leaps. "It does a dance," Michael Triantafyllou said.

The most ambitious direct descendant of RoboTuna is a full-sized free-swimming robotic tuna developed by Jamie Anderson at Draper Laboratory in Cambridge. In the early 1990s Anderson was a graduate student in oceanographic engineering in a joint program at MIT and Woods Hole. She examined propulsion and vorticity control with real fish while participating in some RoboTuna experiments.

"We very much stood on the shoulders of RoboTuna," Anderson said. "We tried to take what Michael Triantafyllou has learned and build on it. RoboTuna is basic science. What we did was implementation, how to make a stable fish and how to make it perform. There are a number of different ways to swim, and we built this instrument to study them." The Draper tuna is called VCUUV, for Vorticity Control Unmanned Undersea Vehicle. It cost nearly a million dollars to build.

VCUUV is "biologically inspired," modeled on a yellowfin tuna caught by a fisherman off Long Island. Anderson and the Draper team constructed a 40-inch urethane mold and then scaled it up to eight feet in length. It contains 65 pounds of lead-acid batteries, electric motors for moving the pectoral fins and a hydraulic power system for operating the four links making up the tail, each of which is powered independently. There is a computer inside

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Jamie Anderson, Peter Kerrebrock and Mark Little, left to right, make adjustments to VCUUV, a free-swimming, eight-foot robotic tuna at Draper Laboratory.

VCUUV that can be programmed with an "umbilical" cord, and also a compass, depth sensor, leak detector and inertial instrumentation. The fish has a half-dollar-size window that an operator can look into to read the indicator lights, "so we can know what the fish is thinking," explains Anderson. There is also an emergency shutoff switch, a big red button on the shore station, operated acoustically.

VCUUV doesn't have sonar or cameras or other orientation devices (a pair of snorkelers usually followed along behind during experiments). So far it has participated in about 100 experiments. In a testing tank at the University of New Hampshire and at a reservoir in Massachusetts, VCUUV has swum in circles, squares and zigzag patterns.

The zigzag experiment was Jamie Anderson's favorite. The robot swims at a maximum speed of 2.4 knots—a good clip for an average swimmer wearing flippers. "Every ten seconds the fish made a 90-degree turn. The person swimming with it was left in its wake. The guys were lifting their heads and saying, 'Where did it go?'"

During the zigzag experiment, the possibilities of fish-like propulsion systems were evident, and for Anderson, thrilling. "A 90-degree turn every 10 seconds is very fast maneuvering. The fish had a 30-degree-per-second turning rate. A typical rigid-hull vehicle would achieve only about 7 degrees per second."

People who have seen VCUUV have loved it, Anderson said. "It reinforces feelings that fish are doing something right, that it's Mother Nature finding optimum solutions. We knew we would be successful if we were true to the fish."

The goal was to transfer fish maneuverability and propulsion to a vehicle, Anderson said. "The ultimate product would be a fishlike vehicle that can do the same missions as a rigid underwater vehicle—ten years from now, twenty years from now—something that might not resemble the fish as much but that will use the hydrodynamics of a fish."

Meanwhile, back at the MIT towing tank, David Beal and Michael Sachinis hone their work with "pressure visualizations." Putting their skills in mechanical engineering to use, they have improved the control of the fish's joints, and its flexibility, partly by installing 500 plastic scales, cut with a laser. RoboTuna II's computers are newer and faster. Its movement is more precise. Sachinis continues to develop the lateral line, adding more pressure sensors.

"Eventually, we should be able to predict the vorticity field with the sensors," Beal said. The goal, of course, is vorticity control, that which the fish developed over hundreds of millions of years.

Ultimately, David Barrett said, "the ocean engineering industry wants an autonomous vehicle they can put in at the dock and say, 'Fly out to the North Atlantic, do these missions, and come back safely.'" If that vehicle effectively employs the mechanics of fish propulsion, converting forces that hinder into forces that propel, it would be, Barrett said, "like traveling across the United States on a tank of gas." At Michael Triantafyllou's lab they're refining that process by fitting the fish with sensors. If they succeed, it might create an entire industry of robotic fish.

Douglas Whynott is the author of Giant Bluefin *and* A Unit of Water, a Unit of Time. *A book of photographs by Peter Menzel,* Robo sapiens: Evolution of a New Species, *has just been published.*

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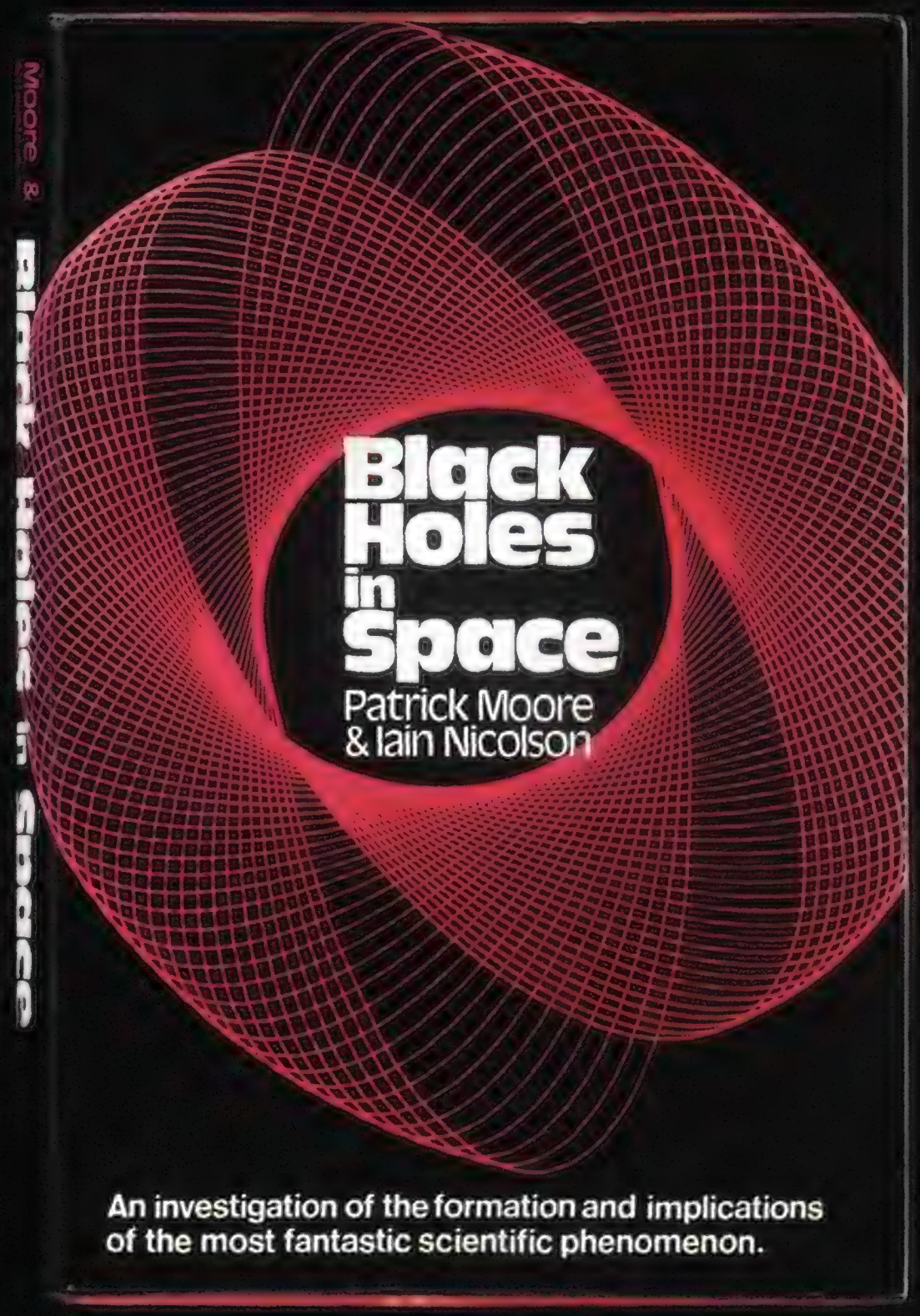
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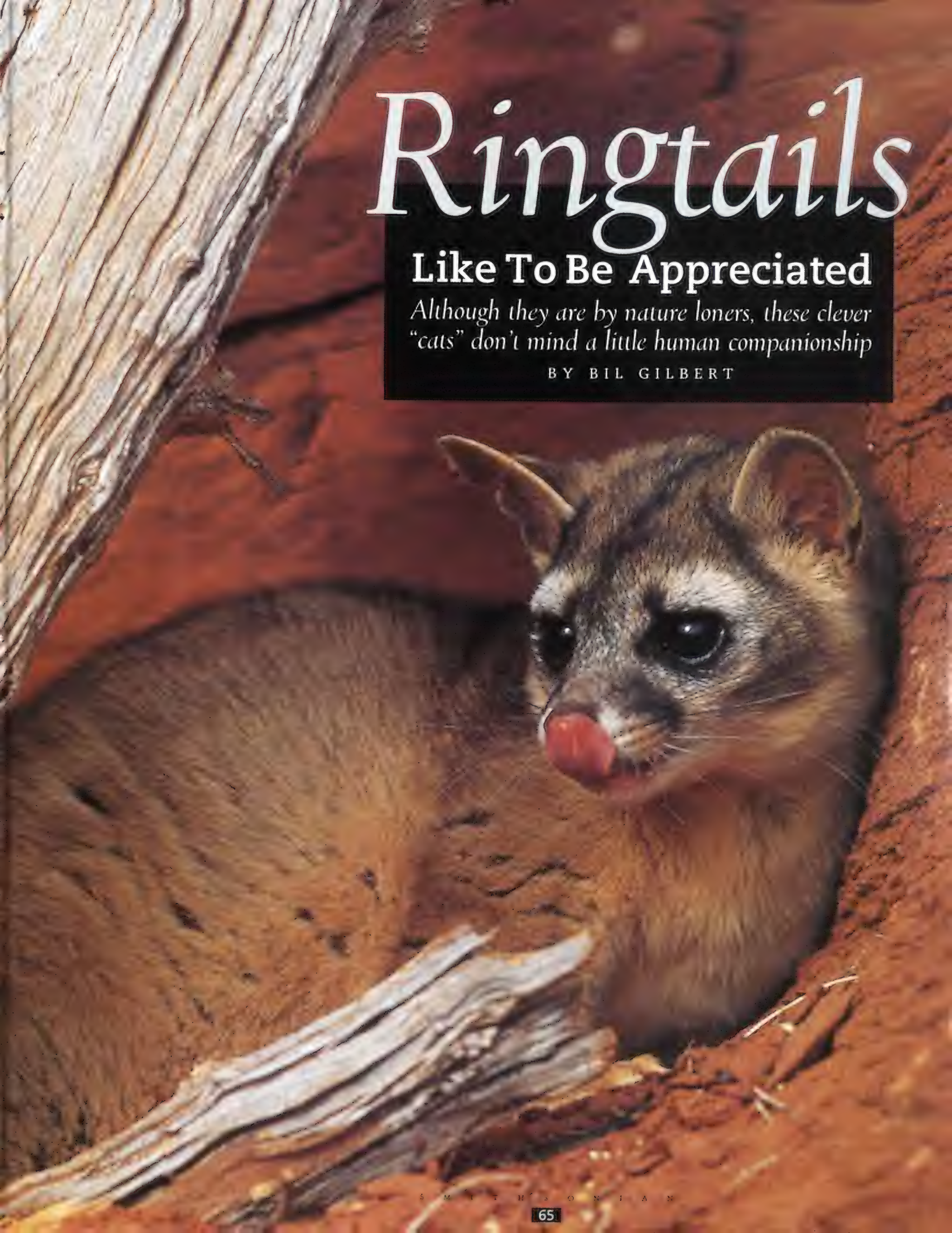
A relaxed ringtail nonchalantly drapes its gaudy hindmost part over a bleached tree trunk, as if to tease the photographer.

Ringtails

Like To Be Appreciated

Although they are by nature loners, these clever "cats" don't mind a little human companionship

BY BIL GILBERT



IF YOU ARE INCLINED TO BELIEVE IN LEPRECHAUNS, YOU will have no difficulty whatsoever appreciating the finer points of ringtail cats. The latter are approximately as abundant in many parts of the Western United States as the former are said to be throughout Ireland. Because of their reclusive ways, both are practically invisible, but when they do appear, people usually are charmed and find them exceptionally cute.

Ringtails in fact are not cats or, taxonomically, much like them. Rather, they are procyonids, closely related to raccoons and coatis, more distantly to pandas. They range from southern Mexico to Oregon and eastward to Oklahoma and Arkansas. Though traditionally found in rocky and brushy places, they are not uncommon in metropolitan areas, because of food, water and den sites unintentionally provided by people. Weighing three pounds or so, with keen hearing and superb night vision, ringtails are among the most thoroughly nocturnal of native predators, being somewhat the mammalian equivalent of owls. By day they wait out the sun in dark nooks and crannies. At night they forage on cliff faces, in crevices, caves, brush piles, hollow logs and trees or, when occupying human settlements, around sheds, barns and houses.

For obscure historical reasons, the ringtail is the official state mammal of Arizona. The animals are widely distributed there, but because of the above-mentioned habits, many citizens are unaware of their presence. When one was captured not long ago by an animal-control agent in the attic of a Phoenix resident, the *Arizona Republic* published a feature on the "rare" appearance of a creature ". . . with Bette Davis eyes, Yoda ears and Greta Garbo's aloofness."

Now, as for this cuteness thing. Admittedly it depends on the eye of the beholder. I have several acquaintances who think opossums are cute. Another who spent time with them in Africa claims that so are adult warthogs. But by every common standard of measure, ringtails must be classified as world-class cute, the North American equivalent of koalas, lemurs and pandas.

The delicate muzzle is sharply pointed and set with long, fine whiskers. Signifying nocturnal activity, the ears are large and upright, and the eyes—huge for an animal of this size—are circled with prominent rings of white fur. Without disrespect for the celebrities cited by the *Arizona Republic*, the face of a ringtail reminds me of a petite, insouciant fox that is wearing a Halloween mask. This likeness accounts for the formal name of the species, *Bassariscus astutus*, a Greek-Latin hybrid meaning "clever little fox."

Ringtail fur is tawny to grayish, soft and silky. The tail, which understandably inspired the creature's common name, is a foot or more long (about the same length as the rest of the body) and dramatically marked with seven to nine white and black rings. In my opinion, it is the best-looking tail in this country. Naturally, it is also functional, serving as a balancing pole as ringtails leap about in rocks and trees, attics and basements. Additionally, the striking markings may confuse potential predators like owls, which at night are decoyed into striking at a flashing white tail ring rather than the body, increasing the chances that the animal can pull away without serious injury.

Ringtails are very efficient night hunters, more similar in many predatory respects to ferrets and martens of the weasel family than to their true kin. Studies in Texas and Utah indicate that more than half of their diet is made up of animal matter. Insects, other invertebrates and small mammals—mice, rats, rabbits, tree and ground squirrels—are staples. Of less-

In captivity, a baby ringtail responds to an unwanted intrusion with a warning that needs no translation: back off.

PAUL BEROUIST/ANIMALS ANIMALS

er importance are birds, fish, lizards, snakes (including an occasional rattler) and carrion.

As hunters, ringtails are quick, stealthy pouncers and gropers. They are adept at manipulating objects with their forepaws, from which protrude tactually sensitive hairs. These, as do the facial whiskers, enable ringtails to feel about in holes and crevices for prey that they cannot see. The claws themselves are sharp, straight and semi-retractable. Ringtails are spectacularly acrobatic in trees and can climb and cling to sheer cliffs and, for that matter, even to buildings. Because of their remarkable agility, in Mexico they are also sometimes called *mico de noche*, or night monkey.

When they are frightened, ringtails exude a musky secretion from an anal gland. As a result of this, as well as their quickness and sensory acuity, ringtails seem to be only occasional prey for larger mammals, including foxes, coyotes, bobcats, mountain lions, coatis and raccoons.

Being curious, opportunistic foragers, ringtails are fairly easy for humans to trap. Some are caught intentionally, though there is limited commercial demand for their small pelts, while others accidentally end up in traps set for other animals. They are sometimes taken because they become nuisances or poultry killers. One ringtail I know of lived secretly, and apparently well, in Tucson until he recently began raiding a private outdoor aviary. He would reach through the mesh, and then grab, pull out and eat parts of the exotic occupants, including a nice parrot. The aviary owner livetrapped the bird killer, who, when I saw him, was caged, healthy if not happy, and awaiting transport to an unsettled area. Surprisingly often, ringtails that have done varminty things receive such lenient treatment. (Basically, because they are so good-looking, they are cut more slack than weasels or coyotes.) People are not much of a threat to ringtail populations in this country and, frequently, have inadvertently enhanced their habitats.

Great horned owls probably are the most successful ringtail predators. Big hawks and other diurnal raptors, however, are also known to take ringtails that are abroad too early or late for their own good. While examining 41 golden eagle nests, students from Texas Tech University found the remains of at least 13 ringtails. On the other hand, Utah ornithologists discovered that a ringtail—identified by scats and other signs—had managed, surprisingly, to get at a peregrine nest and eat the two fledglings in it. Reporting the incident, Clayton White and Gary Lloyd at the University of Utah noted: "The eyrie was located about 70 feet from the top of a 400-foot, smooth, vertical, Navajo

Foraging at night, a ringtail in the wilds of southern Arizona leaps from a boulder. The creatures are stealthy pouncers.

Sandstone cliff and was seemingly inaccessible to mammals, yet ringtails, notorious climbers, had somehow found access to the nest."

Though generally carnivorous, ringtails are also enthusiastic fruitarians. A study on the Edwards Plateau of Texas indicated that during October and November, when persimmon and prickly pear were ripe, these fruits made up half the diet of ringtails. The creatures also fancy juniper, hack and black berries and, seemingly, any garden or orchard fruit.

They obviously have a very sweet tooth, and Alan Whalon describes a tactic ringtails have learned to satisfy this craving. Whalon is a ranger at Chiricahua National Monument, located in an area of southeastern Arizona that has, along with ringtails, some 12 species of hummingbirds. Therefore many people in these parts, including Whalon and his family, hang out hummingbird feeders filled with sweetened water. Keeping the feeders full can be difficult because ringtails seem at least as fond of the artificial nectar as hummingbirds and have become very adept at getting to it. "I can't figure any way to keep them from climbing up to the feeders," says Whalon. "When a ringtail gets there he hangs upside down and drinks it dry. But actually we don't mind because they are so much fun to watch. Ringtails are great little animals."

This also seems to be the opinion of Whalon's three domestic cats which, though never allowed outside the house, have developed an odd relationship with the resident ringtail. "They'll sit there almost nose to nose but separated by the windowpane, the ringtail outside and the cats inside, watching each other. They don't seem hostile or frightened and give the impression of just being curious and friendly. Who knows why, but it's pretty strange."

Others who feed hummingbirds in ringtail country say they have problems and rewards similar to those of Whalon. In addition to the nectar's sweetness, another factor may be attracting ringtails. They are not especially adapted to arid habitats and need to drink regularly. Seldom are these animals found more than a quarter of a mile from at least small springs, or seeps, for which hummingbird feeders, ornamental fishponds or leaky faucets may be acceptable substitutes.

In such well-watered places as California's Central Valley, researchers have found there may be as many as 50 ringtails per square mile. Even in such congregations, however, they are not particularly social creatures. The territories of males (usually ranging in size from 50 to 100 acres, depending on local resources) often overlap those of several females, and sometimes adults travel, groom and den together. But for the most part they are solitary, except during the breeding season, which commences in early spring. The kittens—three or four to a litter—are born 50 to 54 days after conception, in holes and hollows that the females find rather than construct. At about 10 weeks, the kittens begin emerging from the den for periods of play and experimental hunting with the mother. When they are 20 weeks or so, they are full grown, and able and obliged to fend for themselves.

The Huachuca Mountains of south

ern Arizona are inhabited by all three native procyonids—coatis, raccoons and ringtails. It was there while involved in a yearlong field study of coatis that I also became acquainted with ringtails. While watching coatis, which are almost exclusively diurnal, we often found signs of ringtails and, occasionally, when camped at night at springs, caught brief glimpses of them: the flash of a white tail ring and the red, emberlike points of light from their distinctive eyeshine. But the first one I was able to see well and admire was a companion of the late Henry Van Horn.

As a young man, Van had been a miner, an activist member of the Industrial Workers of the World, a soldier in France during World War I and, for several years thereafter, an expatriate in Paris. He spent his next 50 years in or near the Huachucas, sometimes working as a fire-tower lookout, but mainly prospecting. Van knew a great deal about the fauna of those highlands, and when properly approached, he was willing to share his information.

By the time we came along, Van was living in a one-room cabin below a good spring in Bear Canyon on the west side of the Huachucas, five miles from his nearest neighbor, a rancher. We met him accidentally while looking for coatis in Bear Canyon, and at first Van lived up to his local reputation for being a prickly hermit. But after several months, he seemingly decided we were legitimately interested in coatis and not outright exploiters. "Exploiter," we later learned, was a catch-all term of contempt he used for all bosses of anything; most employees of government agencies and corporations; lawyers, loggers, ranchers, hunters; and people who were conspicuous consumers, too rich, or otherwise fools and crooks.

One day we met in Bear Canyon, and Van said that maybe he could show me something I might like to see if I wanted to come down to his place after sundown. I did. In front of the cabin there was a plank bench nailed between two cedar trees. We sat there for a while talking but without Van saying what we were waiting for. When it got to be almost full dark, he went into the cabin, pumped up a lantern, messed around and came out carrying a blue-enamel tin bowl. In it was a gob of leftover oatmeal mixed with honey, which is mostly what Van ate every day. He put it by the doorstep in a patch of lantern light, sat down on the bench and made a squeaking sound by kissing the back of his hand. Immediately a ringtail walked out from under the cabin and began eating unhurriedly from the bowl. After finishing, she licked her forepaws and commenced grooming herself, pausing occasionally to stare unconcernedly at us. Then, sufficiently spruced up, she ambled off into the dark, probably, Van said, to drink at the spring and hunt in the rocks and agave thickets, where rodents were plentiful. "She's cleaned out all the mice and pack rats around the shack. I give her breakfast before she goes to work to make it worth her while to live here."

Van said he always built his shacks—he'd had half a dozen in the Huachucas—in likely ringtail places. The present animal had been with him for three years and twice had kittens that were born under the building and played around outside it before they left in the fall. When Van and the resident ringtail were alone, and the weather was decent, he usually left the door open and put the food bowl inside next to his chair. After eating and grooming, the animal would spend some time poking around the room, "to find out if there's anything new she can use. Sometimes she comes back just before daylight. I'll wake up bleary-eyed and she'll be there like a good dream. Ringtails do more than just keep down mice. Digging holes and breaking rock is grub work. Having something congenial around that looks and acts like they do is a satisfaction. You could say it elevates the mind."

A ringtail curls up in its den to stay warm. Several times a night it goes out to feed on berries, fruit, insects and small mammals, then comes back to nap.

Van asked if I had heard of them being called miner's cats. I said I had. He said when he first worked in mining camps, ringtails were common and welcome around shacks. "But they are choosy. They never stay with drunkards or brawlers. Calling them miner's cats doesn't make much sense anymore. Now, mining's all

CLAUDE STEELMAN

Because of its remarkable agility, in Mexico the ringtail is sometimes referred to as *mico de noche*, or night monkey.

bulldozers and dump trucks. What a ringtail likes best is a quiet old cob who lives in a shack in the brush and can appreciate them."

Ringtails can be writer's cats too. Ten years after the coati study ended, my wife and I moved back to the Huachucas to live in a ranch house south of Bear Canyon. (By then Van Horn had passed on and his shack had been leveled.) Near the house were the remains of a log corral, an ever-overflowing water tank and two old, unpruned but still bearing apple trees in which, one night, I saw three ringtails at the same time. There was also an empty, long-unused bunkhouse, which I furnished with a table, a chair and some propane lanterns as a workplace. Shortly after moving in, I found that one of the ringtails was living under and in the building. I began to set out snacks for her—tangerine sections, bananas, peanut butter and marshmallows were favorites. Once she decided I was rewarding and harmless, the ringtail began to prowl freely about the room. Naturally, while she was there I put aside whatever I was doing to watch her. Digging out words is another kind of grub work, not unlike mining, and those who do it are usually quiet people who welcome distractions and are in need of elevation.

When he was a boy, Rich Hayes, now a ranger in Saguaro National Park, went on a deer hunt in Northern California with his father. They stayed in a cabin that was also used by a bold, active ringtail. "I didn't know anything about them then. The first night I was lying in a sleeping bag listening to this one running around inside the cabin. The next thing I knew it crawled right in with me and wiggled down to the foot of the bag. I was pretty scared but the ringtail wasn't. After a bit, not finding anything, it crawled out. I've been big on them ever since."

The Arizona-Sonora Desert Museum is a popular regional zoo, botanical garden and tourist attraction on the western outskirts of Tucson. Caged ringtails don't attract much attention because they're usually curled up sleeping during normal visiting hours. However, several free-ranging ringtails have moved onto the museum grounds and established territories there. At night the wild ringtails scurry about on the tiles of the Visitor's Center, and a female raised a litter of kittens in the Earth Science exhibit, an open, constructed facsimile of a limestone cave through which hundreds of visitors pass every day.

Pinau Merlin is a naturalist and writer in Arizona. While living in Aravaipa Canyon, she shared her house with a ringtail that one spring bore two kittens. When they were old enough, the female customarily left them in Merlin's bedroom while she went off hunting at night. "They'd run around for a while, get under the bed, into the bedsprings. Then they'd start playing predator. They'd bounce up on the bed when I was in it and start sneaking up toward me, as if they couldn't be seen. I'd laugh out loud or move, and they'd scurry back to the foot of the bed and start all over again. It was wonderful fun for me."

How to explain such easygoing familiarity with humankind by a creature that is by nature elusive and secretive? It's my impression that ringtails' spookiness is less reflexive than is the case with most other wild mammals, and more situational. They seem remarkably insightful about determining when wariness is unnecessary and contrary to their utilitarian self-interest. This has led me to conjecture an anthropomorphic fantasy in which a wise, veteran ringtail lectures young, inexperienced ones about people. "They can be well worth your while. They attract mice and bugs, make pretty good garbage, live around water and build great caves and crawlways. A lot of them make too much noise, and they can get mean. Watch out for traps when you're grabbing their chickens and parrots. But usually they are suckers for cute. Turn on the charm, swish your tail, give them the big innocent eye. You may get some honey or a couple of marshmallows."

Bil Gilbert's profile of the javelina appeared in the August 1999 issue of SMITHSONIAN.

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High on Grass

The news from New York's Central Park has been grim lately, but Maria Hernandez is holding up her end

BY STEVE KEMPER

SINCE I ALREADY KNOW SHE IS A force to be reckoned with, I am not surprised when Maria Hernandez interrupts our conversation and marches right into the middle of a noisy softball game, startling the pitcher in mid-delivery. "Sir," she says politely but firmly, "I can't have this." She points at the napkins fluttering on the ground, the chicken bones on the walkway, the greasy paper plates on the grass around the backstop. The pitcher, a beefy guy in a Yankees cap, shrugs. He doesn't much like being ordered around by this small woman wearing smudged shorts and a green T-shirt. "It'll all be cleaned up," he says with a dismissive wave, turning back to the mound.

"I can't have this *now*," says Hernandez, sharply this time. "And I need all those things"—she points at two dozen heavy coolers and bags crushing her precious grass—"off the lawn and on the benches."

When the keeper of the Great Lawn commands, even ornery New Yorkers comply. They don't have much choice. Hernandez is determined to make sure everyone sees the Great Lawn the way she does, as a delicate 55-acre showpiece, an emerald at the center of Manhattan's Central Park.

Like all fine emeralds, this one was expensive. By late 1995 the Great Lawn had become a rutted dust bowl. Neglect and erosion had turned Turtle Pond into weedy muck. The city and the Central Park Conservancy, a private group that manages the park, closed the Great Lawn for two years and spent more than $18 million restoring it. They planted some 2,000 trees and shrubs, dredged and landscaped Turtle Pond, and laid down a new high-tech lawn on the 13-acre Great Oval, watered by 280 computerized sprinklers. Then the Conservancy gave Hernandez, a horticulturist, the job of protecting their investment.

There's a good deal more to Central Park than its Great Lawn, which was not even part of the original design. The idea for the first major urban park intended entirely for public use was advanced in the 1850s by the poet and

PHOTOGRAPHS BY THEO WESTENBERGER

Horticulturist Hernandez relies on computerized sprinklers to keep part of "her" precious Great Lawn well watered.

"It was my backyard, my playground, my hiding place."

journalist William Cullen Bryant and the famous landscape artist Andrew Jackson Downing. After Frederick Law Olmstead and Calvert Vaux produced the master plan, it was completed by a man named, appropriately enough, Andrew Green. Then, in the mid-1930s, Robert Moses, the first city-wide Parks Commissioner and, later, New York's renowned public-works master builder, had the Great Lawn built on the site of the old Croton Reservoir, between 79th and 85th streets.

Today the park's six-mile perimeter extends from Central Park West to Fifth Avenue, and Central Park South (59th Street) to 110th Street. Notwithstanding the rampage that took place there a couple of months ago, its 843 acres of scenic hills and woods provide a refuge from the stresses of city life. Beyond that, the park provides a suitably beautiful setting for some of New York's most familiar landmarks, including a children's zoo, the Metropolitan Museum of Art, and Belvedere Castle, a Gothic delight designed by Olmstead and Vaux as, in the phrase of the times, a Victorian "folly."

CULTIVATING FLORA—AND HUMAN FAUNA

THE GREAT LAWN, WITH ITS POND AND TREE-LINED PLAYing fields set against the dramatic backdrop of the Manhattan skyline, has been from its inception one of the park's most popular areas, and the recent refurbishment did nothing to diminish its allure. When she was put in charge, Hernandez realized that all her pruning, fertilizing and watering wouldn't matter if she couldn't convince the millions of visitors who use the space not to love it to death again. So she spends almost as much time cultivating the park's human fauna as its flora.

I catch up with her at 7:30 one morning when the Great Lawn is bustling with joggers and dog walkers. She's 42, with plum-colored hair. A dozen thin bracelets jangle on one wrist, and her strong fingers are covered with rings and soil. She's been working on "concert recovery" since 4 A.M. Last night's outdoor performance by the Metropolitan Opera drew 20,000 people—from the lawn's perspective, which Hernandez shares, that means 40,000 human feet. The stage and the equipment trucks have left large brown spots on the grass.

When the lawn gets stressed, so does Hernandez. But the plush expanse of the Great Oval doesn't look as trampled as she'd feared, and her crew has already picked up the trash. The equipment trucks haven't broken any low limbs or knocked over any fences.

We putter along in her golf cart, a rolling office loaded with tools and decorated with a sprig of plastic flowers. I'm amazed how many strollers and dog walkers wave or greet her by name. "Regulars," she explains. The essayist E. B. White noted a half-century ago that New York is actually a big collection of tiny neighborhoods that often feel like country villages. For Hernandez's regulars, the Great Lawn is the village green.

This explains their reactions when the Great Lawn first reopened. They were skeptical that new fences, secluding certain areas, would help the lawn stay green. They were outraged that their dogs could no longer swim in Turtle Pond or cavort on the Great Oval. It annoyed them that they needed permits to play softball. "There was a lot of anger," Hernandez concedes. "People were afraid they were going to lose more than they were gaining. It took a long time for them to realize that we were doing it for them, not for us."

She had hundreds of skirmishes, diplomatically when possible. Belligerents soon discovered the steel behind her customary smile. Every time she enforced a rule, she explained its purpose. Fences gave stressed areas time to recover from overuse. The Great Oval stayed closed until 11 A.M. so it could recuperate from another day in Manhattan and get cleaned up, watered and mowed. Softball players needed permits because the eight diamonds endured 3,500 games per summer, and more would reduce them to dust. Dogs couldn't swim in Turtle Pond because they would disturb the wildlife that Hernandez hoped to entice back.

The message slowly seeped in. People also saw how hard Hernandez and her crew worked to keep this space clean and pleasant for them. Litterbugs got lectures. Boom boxes were quickly silenced. No one was exempt—Hernandez once politely told two mounted police officers to get off her lawn. Consequently, the Great Oval stayed lush and green. The quiet pond attracted dragonflies, butterflies, cormorants, swallows, tanagers, ducks and egrets—egrets in mid-Manhattan! Even the dog owners conceded that things had improved.

I ask Hernandez if there are still enough hardheads around to keep her busy. "Oh, without a doubt," she says, laughing. "This *is* New York."

Like many of her regulars, Hernandez has a long attachment to the park. When she was 3, her family moved from Cuba to New York and lived across from the park at 88th Street. "It was my backyard, my playground, my hiding place," she says. She still lives across from the park, farther uptown, and walks her dogs there.

Her golf cart should have a bumper sticker, "I Brake For Garbage," because she can't pass a wadded wrapper or an empty coffee cup without stopping. At the edge of the Great Oval, she pulls over to ask about the health of a big black dog with a bandaged foot. The dog had collapsed on the Great Lawn recently, and Hernandez had transported it and its owner to a veterinarian. "Maria's Dog Ambulance," jokes the owner as we take off.

Manhattan without Central Park would be a city without a soul. The park provides an idyllic lake setting for boaters (top) and plenty of maneuvering room for roller skaters (above) to do their thing, while, on the Great Lawn, a youthful juggler (left) punctuates the skyline.

In this south-facing aerial view, baseball fields cluster on the Great Oval not far from the Metropolitan Museum of Art, left, and Belvedere Castle, above the Oval.

We cruise over to check on her loyal volunteers, pruning trees and bushes near the obelisk called Cleopatra's Needle. She notices something high on a light pole and sighs, then whacks the thing off with a long pruner. "We have a person who goes around hammering and gluing angels everywhere," she says, picking up the homemade fallen angel. While instructing a volunteer to pull some weeds, she snaps the fluffy head off a dandelion and carefully tucks it into her pocket. The volunteer has spotted a bedroll in the bushes. Hernandez peeks in, grimaces and puts on gloves to haul out a mildewed sleeping bag and two blankets.

It's near noon now. The joggers and dog walkers have been replaced by baby strollers, sunbathers and office workers at lunch. A few people toss baseballs or Frisbees. Hernandez instructs a crew member to water some drooping shrubs: "They're sad today." Some hawthorns are worrying her too. She knows just about every tree and bush in her domain.

No time for lunch. She has to retrieve a trash barrel that someone threw into Turtle Pond from Belvedere Castle. As we row back to shore she's hailed from the Delacorte Theater, where the cast is rehearsing a production for the New York Shakespeare Festival. It seems that two turtles from the pond have deposited eggs near the crew's backstage picnic table. The Shakespeareans foresee tragedy. Hernandez averts it with fencing.

She often ends her day by replacing faulty parts in several of the 280 sprinklers on the lawn of the Great Oval. To get access to one, a crew member cuts out a thick circle of sod. Hernandez lifts it with a fond look. "Isn't that a beautiful root system?" she says happily. She and Russell Fredericks, the park's turf care coordinator, confer constantly, like doctors discussing the treatment of a fragile patient. Are the sprinklers overlapping enough on baseball field six? Does the outfield in field eight look a little brown? Why is there a squishy spot near the backstop on field two?

"This is my favorite spot," she says at quitting time, leaning on the fence at the northern edge of the Great Oval. The lawn's lush perfection stretches toward the pond and the castle. Hernandez smiles, looking relaxed.

Then she tenses. "Hello!" she shouts toward two bikers who've just started across the grass. "Please walk the bikes!" They dismount. Another small victory for Central Park and the ever-vigilant keeper of the Great Lawn.

Steve Kemper wrote about bighorn sheep in the June 2000 issue. New Yorker Theo Westenberger gained a new appreciation for the park on this assignment.

The Desert That Glistened With Water.

Southeastern New Mexico is home to mesquite and chaparral, mesas and horizons that shimmer with heat. For animals of this parched land, survival comes with water. So people who work nearby helped design and build a system of dozens of unique watering units that gather, store and distribute water to bobcats, antelopes, hawks and more. Quenching nature's thirst and giving it a chance to survive.

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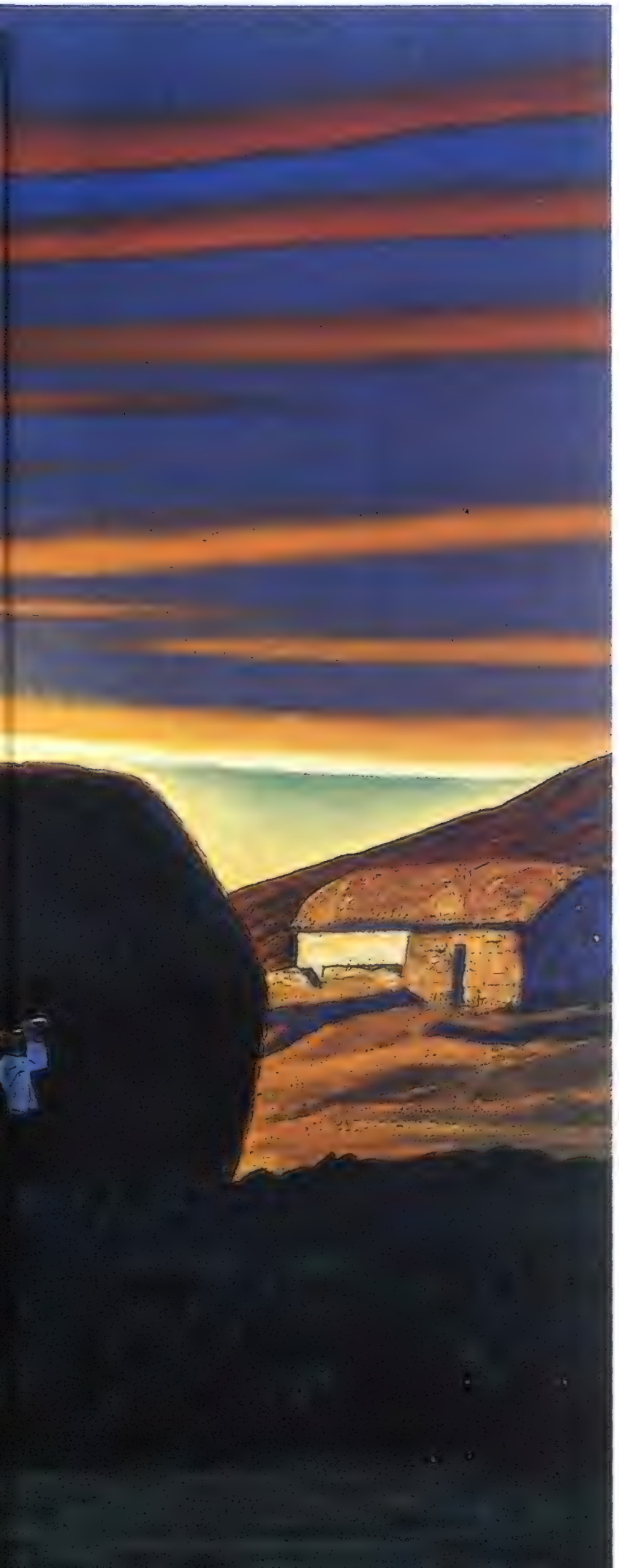
Rockwell Kent was a master of bucolic landscapes, but his contentious politics earned him the nickname "*The Stormy*

Petrel of American Art"



BY SCOTT R. FERRIS

INVOKING THE MEMORY OF LEIF ERIKSSON'S EXPLORATIONS nearly a thousand years before, American artist Rockwell Kent set sail in July 1929 from North America to Greenland across Davis Strait. By mid-July, after tacking their cutter *Direction* for ten days through unpredictable and often foul weather, Kent and his two shipmates anchored for the night in Karajak Fjord, on the southwestern coast of Greenland. By morning, as Kent later recorded in his autobiography, *It's Me O Lord*, the temporary calm was broken by gale-force winds: "Against the hurricane that woke us, that, sweeping downwards from the lofty plateau of the inland ice and ricocheting from the canyon's walls, beat us with rights and lefts, we could do nothing but, like a groggy fighter, hang onto the ropes, our anchor ropes. And once the anchors failed to hold, the game was up. Within a half hour of the time we struck, *Direction* sank."

The three hapless sailors salvaged as much of their personal gear as they could and made for the safety of shore. Kent, more than twice the age of his companions, loaded a pack with provisions, maps, a boat compass, tent, Primus stove and cooking utensils, and trekked nearly 36 hours over rugged terrain in search of help. He finally made contact with an Inuit fisherman, and the two managed to communicate using mimed gestures. Within hours they arrived in Narsaq to orchestrate recovery efforts. Kent's shipmates quickly made arrangements to return home, but the disaster had exhilarated Kent. Rescuing what paints, brushes and remnants of canvas he could from the wreck, and augmenting this with burlap, duck and lumber purchased in the larger settlement of Godthaab, Kent was, he later wrote, "soon well equipped to go to work as if no mishap had occurred. . . ." For the next two months he painted constantly in a natural outpouring of his enthusiasm for all that he beheld in that "vast wonderland of sea and mountain."

Rockwell Kent was born on June 21, 1882, into an affluent Victorian family. His father, Rockwell Kent, Sr., was a partner in a prominent New York City law firm and an entrepreneur in Central American mining investments. His mother, Sara Ann Holgate, was the niece and surrogate daughter of James and Josephine Banker—one of New York's first millionaire families.

The Kents' earliest days as a family were divided between the fashionable lower Hudson River valley, Long Island and New York City,

Kent's stylized rendering of the sunset sky in *Dan Ward's Stack: Ireland* (1926-27) adds an element of drama to this scene of quiet labor. Kent used photographs he took during his stay in Ireland in 1926 to help complete the painting.

In *Campers: North Greenland* (1932), the artist captured the rugged austerity, unique light and local culture of the northern latitudes.

each home brimming with cultural amenities. That comfortable life, however, came to an abrupt end in 1887 when Kent Sr. died of typhoid fever, contracted on a business trip to Honduras. This left Sara with the sole responsibility of raising Rockwell Jr., who was only 5, a second son, Douglas, and a daughter, Dorothy, born not long after Kent Sr.'s death. With the support of Sara's mother and sister, Jo, and the erratic financial assistance of "Aunt Josie" Banker, the young Kent family tottered between the upper-middle-class comforts they had enjoyed and the genteel poverty to which they had become re-stationed.

It was during these tumultuous years that Kent was exposed to and struggled with the discrepancies between social classes. "When I was a young fellow," he later recalled, "I was very much disturbed by there being some people with lots of money and lots of people with no money." Predictably, when he participated in his first election in 1904, he voted for the Socialist party candidate, Eugene V. Debs. In Kent's own words, he measured "being an artist and a writer by being heart and soul a revolutionist." His determination and outspokenness on issues he held close to his heart earned him the epithet "the stormy petrel of American art."

Few other artists in the history of 20th-century American art have received such praise and nearly equal condemnation. For some his name may conjure up bold, sweeping landscape paintings of Maine's Monhegan Island, austere renderings of Greenland or spiritually invested depictions of New York State's Adirondack Mountains. Others may recall his dramatic visual interpretations of *Moby Dick*, *Candide*, *Beowulf* and the works of Chaucer and Shakespeare. Westinghouse, General Electric, Steinway & Sons, Sherwin-Williams and Rolls Royce all capitalized on his renown and creativity. And his support of and participation in innumerable unions and causes, such as the International Workers Order and the American Artists' Congress, gave rise to the 1937 *New Yorker* ditty, "That day will mark a precedent, which brings no news of Rockwell Kent."

Twenty-nine years after his death Kent has returned with a vengeance. Not since the height of his pre-McCarthyism popularity has so much

SUSAN MUNIAK, SCOTT R. FERRIS AND CHAMELEON BOOKS/NATIONAL GALLERY OF ARMENIA

For Kent, the Nordic sagas "opened the gate upon that highway" which led to Greenland and Alaska.

of his work been available to the public. His own writings—*Wilderness: A Journal of Quiet Adventure in Alaska*, *Voyaging Southward from the Strait of Magellan* and *N by E* among them—have been reprinted, and several new volumes on his work have been recently released.

Now, for the first time in 40 years, two paintings from the "Great Kent Collection"—a group of works that the artist gave to the Soviet Union in 1960—have returned to their homeland to be showcased in the exhibition "The View from Asgaard: Rockwell Kent's Adirondack Legacy." On display at the Adirondack Museum in Blue Mountain Lake, New York, through October 15, the show—which features luminous landscapes, sociopolitically infused graphics, advertising art, and memorabilia of the artist's life on the Adirondack dairy farm he called Asgaard—offers an unprecedented overview of Kent's later years.

Two other exhibitions are also currently on view: "Commercialism and Idealism: Bringing Art to Advertising" can be seen through December at the Rockwell Kent Gallery on the Plattsburgh campus of the State University of New York, and "Distant Shores: The Odyssey of Rockwell Kent"—which features seven additional paintings from the former U.S.S.R.—is at the Norman Rockwell Museum in Stockbridge, Massachusetts, through October 29 and will travel to museums in Florida, Illinois and Alaska before closing in September 2001.

Kent's first love was painting. His work in book illustration, advertising and architectural rendering, and in designing fabrics, metalware, jewelry, murals and ceramic patterns, was primarily a means to make a living, as were his forays into dairy farming, carpentry, home construction and lobster harvesting. Though he studied architecture at Columbia University, he had a lengthier tutelage in the fine arts under some of the most prominent artists of the day. Kent credited William Merritt Chase with having taught him to use his eyes, Robert Henri with encouraging him to enlist his heart and Kenneth Hayes Miller with urging him to use his head.

In one of Kent's early paintings, *Fishermen*, one sees the Impressionist handling of paint that Chase and Henri employed in their own work, but one also glimpses Kent's concern for the human condition, a trait that had been inspired by Henri.

Of all of Kent's mentors, however, it was perhaps Abbott Thayer (SMITHSONIAN, April 1999) who made the most lasting impression on the young artist. As an early apprentice, Kent aided Thayer with his work on concealing coloration. In return, Thayer provided Kent with what the artist considered to be "one of the richest cultural experiences" of his life. In the primitive but hearty surroundings of Thayer's Dublin, New Hampshire, home, Kent participated in debates on the writings of Tolstoy, Emerson, Darwin and Thoreau, listened to German lieder and was introduced to the Nordic sagas. For Kent, these tales "opened the gate upon that highway to the North which led at last to Greenland and Alaska." It was also at Thayer's home that Kent met the elder artist's niece Kathleen Whiting, whom he would eventually marry.

Kathleen was tall, soft-spoken and beautiful. Kent believed that she "revealed the depths of her emotional nature only when, overcoming her shyness and her natural modesty," she sang and played the piano. A devoted mother, Kathleen remained loyal to the marriage despite Kent's open infidelities.

Eventually, though, Kent's promiscuous behavior, lust for life and tendency to uproot his family in search of his own goals wore on Kathleen, and the couple divorced when their fifth and youngest child, Gordon, was little more than a toddler. Kathleen was the only wife with whom Kent would have children. Yet she, like subsequent wives Frances Lee and Shirley "Sally" Johnstone—a woman the age of Kent's youngest daughter—was expected to serve at Kent's beck and call. Frances and Sally were also in charge of secretarial duties and of hosting the household's baronial parties. All in addition to keeping house and garden on a constant pre-sunrise to post-sunset schedule.

Throughout his life, Kent (pictured here c. 1905) sought inspiration for his canvases in nature.

Not unlike Thoreau, Kent found

ARCHIVES OF AMERICAN ART, SI; ROCKWELL KENT PAPERS; PP. 78, 79 SUSAN MUNIAK; SCOTT R. FERRIS AND CHAMELEON BOOKS/STATE HERMITAGE MUSEUM, ST. PETERSBURG

An early masterpiece, *The Road Roller* (1909) was painted during one of Kent's stays in Dublin township, New Hampshire.

his "Walden" in the wilderness—in sojourns in Newfoundland, Alaska, Tierra del Fuego and Greenland. His trip to Alaska, he wrote, was "in no sense an artist's junket in search of picturesque material for brush or pencil, but the flight to freedom . . . the pilgrimage of a philosopher in quest of Happiness!" Over a period of seven months during 1918-19, Kent, with his 8-year-old son Rockwell III, lived on Fox Island off the coast of Seward, Alaska. There they were secluded from all but the island's sole permanent resident, Lars Olson, and his goats. Their only contact to civilization—Seward, roughly 12 miles away—was reached by means of a sometimes motor-driven, often muscle-powered dory. On their island paradise, father and son kept busy by exploring the mountainous terrain, and cutting and splitting wood to fuel their stove. They bathed by warming themselves by the stove and then rolling outside in the snow. Young Rockwell drew, and wrote letters to his family back home. His father kept him schooled with required readings and entertained him at bedtime with excerpts from such tales as *Robinson Crusoe*. In addition to writing, painting and drawing, Kent, too, read widely from their library, including volumes by William Blake and Nietzsche—works that critics believe influenced his art. Some of the paintings he produced during this period, such as *North Wind* and *Superman*, portray soaring figures that represent the primordial vitality he experienced in the wild and are meant, according to Kent, to symbolize such concepts as "Energy" and "Will." Other canvases, especially his pure landscapes, proclaim his reverence for nature.

During Kent's absence Kathleen had been forced to borrow money to support the family. But a financially successful exhibition of Kent's Alaska drawings at the Knoedler Gallery in New York provided a substantial influx of cash. The purchase of a home in Vermont, however, again drained the family's resources.

For years Kent lived the precarious life of the starving artist and was dependent upon aid from various outside sources. One such supporter was collector Duncan Phillips, who wished to create a "Kent unit," featuring works from each of the artist's adventures, in his new gallery—now the Phillips Collection—in Washington, D.C. Toward this goal Phillips at one point offered to provide Kent

with a stipend of $300 a month in exchange for first choice of two paintings per year. Over the course of their nine-year relationship, Phillips acquired a number of works, including the masterpieces *North Wind* and *The Road Roller* (opposite).

The Knoedler show of Kent's Alaska drawings proved the marketability of his artwork and convinced a few well-to-do friends to take stock, literally, in the artist's abilities. Thus was born a unique venture—put together by Kent and his friend Carl Zigrosser, a renowned authority on prints—to incorporate the artist. Rockwell Kent, Inc., provided Kent with enough income to secure his household while he got to work. Within two years his income was such that he was able to pay back his investors with a dividend.

For Kent, success begot success. His friend George Putnam published *Wilderness: A Journal of Quiet Adventure in Alaska,* which, according to the British paper *The New Statesman*, was "easily the most remarkable book to come out of America since *Leaves of Grass*." A second showing of Kent's artwork at Knoedler, "The Alaska Paintings," was both a critical and financial triumph. These accolades brought renewed attention to his work as a painter and opened the door to his careers as an illustrator and adventure writer. With change in his purse and the end of his marriage to Kathleen in sight, Kent sought a more permanent "flight to freedom" and the beginning of a new life.

Within a year of his divorce from Kathleen in the summer of 1925, Kent met a young divorcée, Frances Lee, at a luncheon party at the home of mutual friends. Kent was enamored with Frances and immediately began courting her. In his bid for her hand, Kent gave her stationery that he had had engraved with the initials "F. L. K." It was a gift she could not refuse.

In 1927 the newlyweds purchased an

"Sometimes (in spite of the physical evidence) I suspect he is not a person at all, but an Organization."

abandoned 257-acre parcel of farmland south of the village of Ausable Forks, New York. There, in full view of Whiteface Mountain, the couple conceived plans for their new home, for which Kent drew up the blueprints. They moved in the following year and eventually added a studio, dairy barn and numerous support buildings. Kent named this now-operational dairy farm Asgaard, Norse for "home of the gods." It was here that Kent found his "Paradise," the final home where he chose "to spend eternity." Asgaard was close enough to the hub of Kent's livelihood, New York City, to easily maintain business, yet far enough away to allow him his freedom.

Kent was a man of boundless energy. His friend, the poet and anthologist Louis Untermeyer, considered him to be "the most versatile man alive. . . . Sometimes (in spite of the physical evidence) I suspect he is not a person at all, but an Organization. . . ."

Kent traveled to Greenland three times after moving to Asgaard and wrote three books about those travels, two of which are as much an anthropological record of 1930s Inuit life as they are the story of their gallivanting hero. The artwork he created abroad kept him knee-deep in exhibitions for years to come. At Asgaard the Kents hosted elaborate dinner parties that usually extended into the wee hours of the morning, at which time Kent would begin his tireless daily regime of work. The guest list for the Kents' parties included many of New York City's socialites—the Cowdins, Pulitzers and Putnams—his fellow Arctic enthusiasts Peter Freuchen and Vilhjalmur Stefansson, and such notables as actor Paul Robeson, writer John Dos Passos and singer Pete Seeger.

Kent's artwork, especially his Adirondack paintings, radiates with pride in his personal accomplishments and with his nationalistic fervor. Whereas *Adirondacks*, with its grand view toward Whiteface Mountain from the vantage point of an abandoned farm, can be interpreted as representing the seed from which Kent's Asgaard grew, *Asgaard's Meadows* (pp. 86-87) seems to represent his farm in full blossom—meadows are pruned and an abundance of Jersey cattle graze. *America*, on the other hand, depicts civilization's reach into the "New World." In Kent's *America* we see a small ridge of land—jutting up from a vast sea of broad valleys and endless templed hills—on which

Kent turned out numerous wood-block illustrations and prints. *Workers of the World, Unite!* is from 1937.

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Kent's publicity stunt worked. Newspapers all over the country covered the story.

a pioneer family is bathed in hallowed sunset light. Robert Henri once aptly observed that Kent's canvases were the "proclamation of the rights of man, of the dignity of man, of the dignity of creation."

The artwork that is on display in "The View from Asgaard" demonstrates Kent's long commitment to realism as well as his romantic and social-realist tendencies. He was at once a regionalist, depicting the American scene around him, and a modernist, creating compositions that featured simplified, stylized forms and a reduced palette not unlike those of his contemporaries Edward Hopper, Arthur Dove and Georgia O'Keeffe.

When Kent first tried to ship *My Daughter Clara* (1914) from wartime Newfoundland to his dealer in New York City, Canadian officials, convinced the painting concealed secret information meant for the Germans, blocked its passage.

Kent's dedication to brotherhood and world peace is perhaps best conveyed in his 1944 mural *On Earth, Peace*, originally commissioned by the Air Transport Association as an easel painting for the House Committee on Interstate and Foreign Commerce. Once Kent saw the 16-by-11-foot arched niche in the committee room, however, he offered to decorate it instead for the same $2,500 fee. The mural depicts cars, buses, boats, trains and airplanes in a landscape that reaches out to the horizon. Kent even included his beloved Asgaard Farm. But the overwhelming element in the artist's painting is four angels hovering above, spreading bounty and peace to all corners of the world—Kent's vision of peace for a world caught up in a protracted and devastating world war.

As *On Earth, Peace* espoused Kent's concerns for world harmony, his 1937 murals *Mail Service in the Tropic and Arctic Territories of the United States* dramatized his devotion to human rights. The two panels, mounted on both sides of a hallway entrance in what is now the Ariel Rios Federal Building in Washington, D.C., illustrate the far reaches of the United States mail service, from Alaska to Puerto Rico. On the left we see Inuit sledge drivers bringing mail to a pilot (who bears an uncanny resemblance to the artist) for delivery, presumably, to Puerto Rico. On the right, a postal carrier on horseback delivers that mail to eagerly awaiting Puerto Rican citizens. Kent purposefully draws attention to a group of four women by exaggerating their expressions of surprise following their reading of a letter. The letter, which is written in an Alaskan Inuit dialect, translates: "To the peoples of Puerto Rico, our friends: Go ahead, Let us change chiefs. That alone can make us equal and free"—a direct reference to the Puerto Rican Nationalist independence movement.

Kent had written the letter in Inuit as a ploy calculated to attract attention to that cause. To that end, he had enlisted the help of his friend Vilhjalmur Stefansson and a newspaper reporter by the name of Ruby Black. Black wrote of endlessly searching for someone who could translate the letter when at last she came upon the renowned Arctic explorer Stefansson. Kent's publicity stunt worked. Newspapers all over the country covered the story. Embarrassed conservative Puerto Rican politicians and employees of the U.S. Treasury Department—which had commissioned the work—scurried to denounce Kent's actions. "My simple little trick," Kent stated, "has given the Nationalist movement more front-page publicity than was accorded to the Ponce Massacre. . . ." (Eighteen Nationalists had died and more than 100 had been wounded when police fired into a crowd of demonstrators on March 21, 1937.)

By the 1950s Kent was totally immersed in the political upheavals of the day. His call for recognizing human rights throughout our society, his pro-Communist and premature anti-Fascist activities during the Span-

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Part of the Great Kent Collection given to the U.S.S.R., *Asgaard's Meadows* is one of the highlights of the Adirondack Museum show.

ish Civil War, his support of more than 80 unions and causes, his endorsements of Henry Wallace and of the American Labor Party, and his steadfast belief in socialism as a means of curing our social ills resulted in the boycott of his dairy business in 1948 and ignited his prolonged legal battle with the U.S. Department of State for his right to a passport. Later that year he mounted an unsuccessful campaign as the American Labor Party candidate for a seat in Congress.

In the summer of 1953, when Kent was 71 years old, he began making plans to disseminate a large portion of his own artwork and manuscripts from what he "amusedly termed" the Great Kent Collection. He personally met with Wendell Hadlock, the director of the William A. Farnsworth Library and Art Museum in Rockland, Maine, about an exhibition of his work for the following summer. This discussion led him to believe that he had also found a home for his collection. But following a summons for Kent to appear before Senator Joseph McCarthy's Permanent Subcommittee on Investigations, the once convivial atmosphere initially shared between Hadlock and Kent disintegrated, and the artist's hopes of giving his collection to an American museum evaporated.

Four years later, in honor of his 75th birthday, Kent was invited to the Soviet Union to celebrate the event and to become the first American artist to be given a solo exhibition in that country. Though he was still embroiled in litigation with the State Department over his passport and could not attend, he organized the shipment of 55 canvases and approximately 163 graphic works for the exhibition. While the show was on its five-city tour, the U.S. Supreme Court handed down the decision that Kent and every American was entitled to a

passport; immediate travel plans allowed him and his third wife, Sally, to catch up with the exhibition during its stay in Kiev. The overwhelming support and friendliness extended to the couple during their visit encouraged the Kents to give their "Great Kent Collection"—80 paintings and more than 700 graphic and literary works—to the people of the Soviet Union. On November 16, 1960, in a ceremony in Moscow, Kent stated, "I can only hope that the American people, who have often shown their liking for my work as a painter, realizing that their access to it is hindered by institutional and governmental control, will understand the compelling motives of my gift."

For years Kent dashed off whimsical drawings for *Vanity Fair* under the pseudonym William Hogarth, Jr.

Following Kent's bequest to the Soviet Union, he continued to paint from his home at Asgaard. It was that view, "westward and heavenward to the high ridge of Whiteface, northward to the northern limits of the mountains, southward to their highest peaks," from which he drew his inspiration to create such radiant canvases as *Cloud Shadows* and *Winter Sunrise, Whiteface Mountain*. He also resurrected for publication the diary of his second trip to Greenland (*Rockwell Kent's Greenland Journal*), released the tales of his 1968 return to Newfoundland (*After Long Years*), and continued to work on an update of his autobiography—which to this day has yet to be published.

The Kents made numerous trips to the U.S.S.R. and Eastern Europe and often brought with them additional gifts for their Soviet friends. In 1967 they returned to Moscow for Kent to accept the Lenin Peace Prize.

The following year, at the invitation of Premier Joseph Smallwood, the Kents traveled to Newfoundland. In 1914 Kent had moved his family to Newfoundland in search of the "stark grandeur" that inspired his creativity. He renovated an abandoned house, painted, and hiked the hillsides, singing German folk songs. Suspicious neighbors began rumors that he was a spy, concealing charts of coastal fortifications within his paintings and maintaining radio contact, regarding refueling, with German U-boats. When the villagers turned their backs on him and community officials sought his expulsion, Kent responded in a typically brash manner by feeding their suspicions. On one occasion he placed a sign above the doorway of his studio that was decorated with the German imperial eagle and the words "Bomb Shop, Wireless Station, Chart Room." The Kents were ordered out of Newfoundland in 1915. Fifty-three years later, Kent returned to the province as an honored guest of the government to receive an official apology for the wrong that had been done to him.

Throughout his later years Kent's health deteriorated. In 1962 he had suffered a stroke that had paralyzed his left side, and in 1965 a pacemaker was implanted after his heart began to fail. Four years later lightning caused a fire that destroyed his Adirondack home and most of its contents, including some artwork and a life's worth of memorabilia. Fortunately, most of his art was either in his studio, which was a distance away from the main house, or in a gallery in New York City. At the time, 50 cartons of Kent's papers had been readied for shipment to the Archives of American Art, now at the Smithsonian Institution in Washington, D.C. Some of these papers were destroyed, while others still bear the telling effects of the conflagration.

Always the fighter, Kent set about drawing up plans for a new house the morning after the fire. He later wrote a friend, "one can't start life again at eighty-seven and hope to have much time for rest." Sally Kent recalled a similar expression of her husband's desire to live life to its fullest: on a radio interview, asked if he had accomplished all that he had set out to do, Kent replied, "I look back over my life, and see my one little wandering track and realize all I haven't done. Is what I've done enough? Lord no!"

Kent died on March 13, 1971. There remains, however, a persistent cloak of controversy—a dynamic love-hate relationship—that is rekindled with each mention of the man and his work. A friend once told me that great art arouses either profound appreciation or intense dislike. For whatever reason, Rockwell Kent's work does both.

Scott R. Ferris, the author of two books on Kent, served as guest curator for "The View from Asgaard" and is currently compiling a catalogue raisonné of the artist's paintings.

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With Santa Monica Beach as his canvas, artist Doron Gazit uses the wind to animate his dynamic plastic-tube sculptures.

Tickling the Sky

ISRAELI DESIGNER DORON GAZIT HAS HARNESSED THE WIND TO CREATE IMMENSE VISUAL SURPRISES—AND A WHOLE NEW FORM OF ART

PHOTOGRAPHS BY ERIC SANDER & DORON GAZIT

DORON GAZIT'S ARTISTIC REVELATION CAME two decades ago when he visited a remote Bedouin tribe in the Sinai Desert.

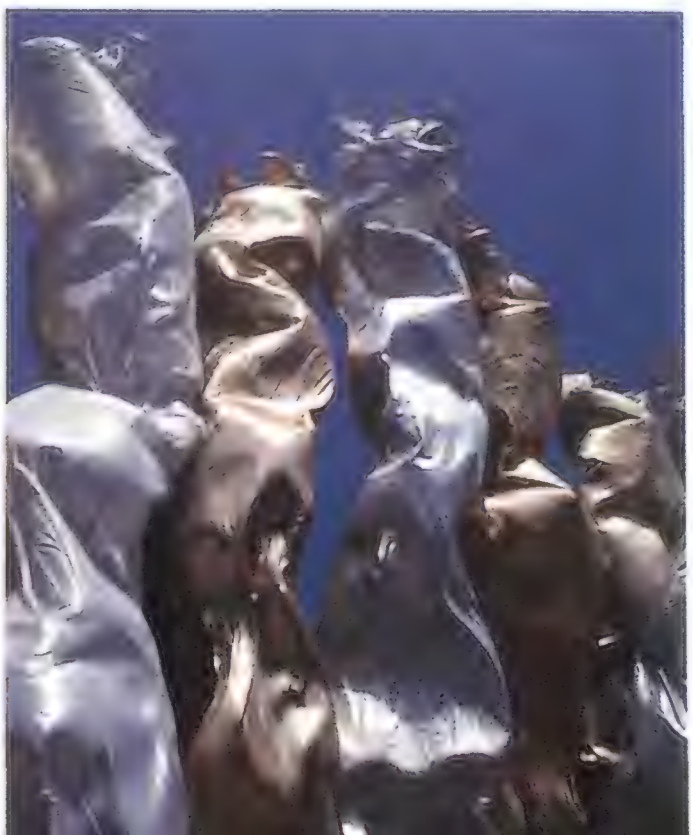
The Israeli designer always kept a handful of balloons in his pocket, a habit from his college days when he earned money twisting them into shapes for children in Jerusalem. Never before had these nomads seen a balloon—and it caused instantaneous delight. "They tried to hug and squeeze it," he says. What was it about balloons that caused so much joy, he asked himself? And then it hit him: it wasn't the colored latex of the balloon itself that was so fascinating but the air it contained. From that moment on, Gazit became a sculptor of the wind, and as he puts it, a student of "airchitecture."

Gazit has spent the intervening years working not with paint or marble but with wind, using immense tubular inflatables to give it shape, form and color. With powerful blowers, he's created "vertical wind," sending tubes shooting up into the sky. His collection of lifelike 60-foot-tall Fly Guys caused a stir during the closing ceremonies of the 1996 Olympic Games in Atlanta as they danced and twisted among the crowd. His colorful creations have been wrapped around buildings, draped from a cliff and joined together to form immense, freestanding sculptures. He is planning now to weave clouds using tubes dragged from airplanes.

He and his designers at Air Dimensional Design, Inc., have created breathtaking pieces that have entertained millions, yet the artist always comes back to those thrilling moments with the small group of Bedouin. "It's the capacity of balloons to cause such a deep feeling of joy," he says, "that makes working with the wind so exciting."

— *John F. Ross*

Doron Gazit (top left) has "sculpted the wind" for more than 20 years, creating such crowd pleasers as the 60-foot-tall Fly Guys (above), which inflate fully in four seconds with the flip of a switch of a heavy-duty fan. Tied together, his Windtubes (right) form a pyramid on California's Santa Monica Beach, while his latest design, Air Flames (far right), gives the illusion of fire.



Top: Gazit designed seven, 400-foot-long, rainbow-hued Airtubes to float on the Asahi River in Okayama, Japan. Left: Gazit and a dozen assistants wrapped New York City's Old Customs Building with inflatable tubes for the centennial celebration of the Statue of Liberty. Above: Gazit's 30-foot-tall Sky Ticklers feature as many as 13 tentacles attached to the top end of a tube.

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IN MASTERPIECES OF METAL AND WOOD, MODERN CRAFTSMEN REVIVE A STRAIGHT-SHOOTING ICON OF THE OLD FRONTIER

PHOTOGRAPHS BY WALTER P. CALAHAN

"IF I DIDN'T DO THIS, THERE'D BE A WICKED BIG HOLE IN MY LIFE." DAVID PRICE HAS A salt-and-pepper beard and a New Hampshire accent only slightly thinner than Indian pudding. Jeans and red suspenders are among his essentials, and so is the wooden workbench over which he bends—so essential, in fact, that he had it shipped all the way from New Hampshire to Washington, D.C. last summer. At the turn of the millennium Price practices a most unusual craft. He is a maker of longrifles—popularly known as Kentucky rifles, for the most famous wilderness they helped subdue—and several samples of his work were exhibited at the Smithsonian Institution's Folklife Festival as prime examples of New Hampshire's traditional arms-making industry. They were much admired and handled by many of the festival's 1.1 million visitors.

At Williamsburg, a craftsman forges a barrel for a longrifle (top), and two others cut the rifling grooves in a finished barrel (above).

The longrifles that Price creates are modern versions of slender, elegant flintlock firearms of the 18th and early 19th centuries. Originally made in Pennsylvania, the longrifle played a crucial role in early settlement, and some people argue that it was a significant factor in the formation of the national character. Part tool, part weapon, sometimes status symbol, it was a unique New World creation growing out of European technology and the demands of the American frontier.

Today, in a world seemingly awash with assault rifles, as arguments over the availability of firearms roil the nation's politics, it is easy for some to forget that a different environment existed two centuries ago, and different attitudes toward firearms.

The longrifle reflected the determination of a transitory people for whom the securing of land was a daunting imperative. Longrifles inspired admiration, and fear, from before the Revolutionary War until after the Battle of New Orleans. Their appeal continued in the backwoods of Appalachia until the Civil War, and it persists today among a small, dedicated cadre of history buffs and gun builders for whom this emblematic weapon still serves as a vehicle for traveling backward in time and as an icon of fine craftsmanship and American ingenuity.

I spent several months talking to some of these aficionados and looking at examples of old and new longrifles, and I learned some surprising things. For instance, when it arose in the 1600s, the flintlock ignition system was a design marvel and a significant advance over the existing matchlock and wheel lock. Antique longrifles in good condition can cost in excess of a hundred thousand dollars today, but new ones, too, can be breathtakingly expensive. And though contemporary practitioners of an art that reached its zenith two centuries ago freely interpret from early designs, for the most part they consider their work creative, not re-creative. To most of them, the words "reproduction" and "replica" are insults.

The longrifle's evolution is complicated but, generally speaking, is an amalgam of two dominant types of firearms of the early 18th century: the long, smoothbore English fowling piece, or shotgun, and the shorter jaeger (from the German *Jäger*, or hunter), with a rifled, octagonal barrel. The term "rifled" refers to the spiral grooves cut into the barrel's bore to impart a spin to the speeding ball, thus greatly improving its accuracy. And thus the distinction between the "rifle" and such smooth

The longrifle was used in the French and Indian Wars, but the Revolution made it famous.

bore firearms as the musket and shotgun. Both rifled jaegers and smoothbore fowling pieces were made with flintlocks, ignition devices with cock and flint that replaced the expensive, complicated wheel locks.

Germans coming to William Penn's colony included gun makers, who found very different needs here for firearms than in Europe. As settlers pushed into the continent's interior, the jaeger grew in length to accommodate those needs. The American hunter, newly equipped with a longrifle, was better able to spend weeks or months each fall and winter roaming a vast, often hostile landscape populated with many more kinds of game than in Europe. Because a longer, rifled barrel, sized for small-diameter, single lead balls, was more accurate and efficient than other weapons, he was able to strike a target at considerable distance, and to conserve scarce, expensive gunpowder.

Some gun makers had access to barrels and flintlocks made in Philadelphia and even Europe, but those on the frontier often had to fashion their own. Forging a barrel required the heating of a thick metal sheet that was then arduously hammered around a mandrel until it became a uniform tube, welded at the seam. Rifling, another difficult, time-consuming task, was done by hand with a rod embedded with specially hardened metal teeth and fitted into a guide.

Stocks were usually made of curly maple, as they are today. Adornment depended upon the disposable income of the gun purchaser, and upon the gun maker's skill and access to brass, silver and gold. Longrifles varied from the so-called plain "poor boys" to embellished avatars of an ancient Old World craft. Fancy ones announced the prosperity of the owner, and revealed the possibilities of carving, and of precious metal teased into flowers, faces and scrollwork and inlaid into burnished wood with a depth and complexity all its own.

The longrifle was used sporadically in the French and Indian Wars, but the Revolution made it famous. The army first authorized by the Continental Congress in 1776 and placed under the command of George Washington was actually made up of ten companies of riflemen, which were soon joined—and outnumbered—by New England musketmen. Later, when Virginians, Marylanders and Pennsylvanians armed with longrifles joined local troops battling the British in Boston, the jaw-dropping accuracy of the frontiersmen's long, graceful alternatives to the smoothbore muskets impressed friend and foe alike.

In the hands of skilled backwoods marksmen and snipers, the rifle came into its own in ambushes and defensive battles, but couldn't replace musketeers in conventional, set-piece battles. Longrifles couldn't be reloaded as quickly as muskets, so they lost the effect of close-range massed fire at masses of troops. And they couldn't be fitted with bayonets. But the advantages of longer-range accuracy had been recognized, and a quicker-loading, shorter version of the rifle was eventually adopted by the U.S. military to replace its smoothbore muskets.

For the frontiersmen of the early 1880s, shorter, heavier rifles, developed for the different conditions of the plains and Western mountains, and using the much more advanced percussion system—which ignited gunpowder with an explosive cap rather than a spark—succeeded the flintlock longrifle of the Eastern woods. The lovely longrifle went into a decline, many cut down and converted to percussion, others forgotten, to rust away.

Original longrifles are sprinkled in collections throughout America—including one in the Smithsonian's Museum of American History—but they have been joined in recent

Natty Bumppo aims his longrifle at pursuers in *The Flight Across the Lake* by N. C. Wyeth, from James Fenimore Cooper's novel *The Last of the Mohicans*.

BRANDYWINE RIVER MUSEUM, BEQUEST OF MRS. P. SHELTON GOLT

decades by contemporary versions that rival, and in some cases surpass, the earlier guns in craftsmanship and imaginative power. These are the products of a renaissance that began in the 1930s but picked up momentum in the 1950s and early '60s, inspired in part by the Davy Crockett and Daniel Boone television shows, and then by a revival of interest in craftsmanship, and the skills of the past, that took off in the 1970s. New flintlock rifles are purchased today by a wide assortment of Americans who generally share a love of history and of the objects that most effectively and dramatically personify it. Using such an object is part of that appeal. Black powder shooters, many firing contemporary longrifles, regularly compete in matches organized in various parts of the United States by local and national organizations. They have their own publications, like *Muzzle Blasts*, the glossy magazine of the National Muzzle Loading Rifle Association, and quarterly journals, and they are a highly diverse group, including scholars and entrepreneurs, doctors and blue-collar workers.

Using locally panned gold for the inlays, Alaska gun maker Judson Brennan spent three years creating this $55,000 flintlock longrifle for collector Gordon Barlow.

Some purchasers of longrifles never fire them but hold them in collections to admire their beauty, or wait until their value appreciates, and then sell them again or "trade them up." Other people buy longrifles not for collecting but for gatherings of like-minded devotees of history who don period clothes, and camp, cook and generally comport themselves as if they occupied an animated etching of the Republic of Jefferson and Adams. Such "rendezvouses"—not to be confused with historical reenactments—have in recent years grown into large, often family-oriented gatherings organized by "booshways," most likely a corruption of "bourgeois," the French word for the factors of the old fur trade who went deep into the wilderness to collect the furs taken by trappers. At the rendezvous encampments, flintlock rifles are proudly displayed on racks, sold by latter-day sutlers, and fired in shooting matches by men and women.

Prizes often include rifles made by one of the several dozen gun makers recognized as the best, whose pieces fetch $4,000 or more. (And in some cases a lot more.) For the most part these artisans pursue their craft solitarily, in locations as different as Williamsburg and the smallest of towns in Alaska.

In New Hampshire, David Price makes three to five rifles a year, focusing mainly on longrifles. The unfinished stock of one is secure now in a vice, the outlines of scrollwork, still to be carved, traced on it with a lead pencil. Arrayed around it are tools not much changed in two centuries—fine chisels, mallets, files, engraving blades, coping and scroll saws—and some distinctly modern ones: an electric drill press, metal lathe, plane, grinder and joiner; a number of buffing machines; and an industrial vacuum cleaner. On the walls hang powder horns, two mounted deer heads and a quote from Benjamin Franklin that Price copied by hand: Where liberty dwells, there be my country.

Price started making rifles at the age of 20, inspired by his father and grandfather, who were also amateur gun builders. He kept it up while running a painting business, and over the years he saw a steady improvement in the quality of gun parts that he could order by mail, particularly the flintlocks.

"In the early '70s people would buy old longrifles and take them apart mainly for the locks," he says. That complicated mechanism must function with sequential precision: when the trigger is pulled, a lever—the sear—disengages, permitting a very strong spring to fling the cock with its chisel-shaped piece of chert or flint (English flints are the best) against a hinged steel piece called the frizzen. When struck by the flint, the frizzen flips forward, exposing a pan filled with fine black powder to the sparks engendered by the impact. The sparks ignite the gunpowder in the pan, causing a violent little flame that flashes from the pan through a narrow touchhole to the bore, where it ignites the main charge. Though some gun makers fashion their own locks, companies that specialize in their manufacture produce many of the high-quality locks used today.

Good barrels also became available from manufacturers in

GORDON BARLOW/CLA (2)

"The difference between a good gun and a great one is 1/32nd of an inch of wood here and there."

the 1970s, in part in response to the demand from a growing number of craftsmen. So reliable has mail-order longrifle hardware since become that beginners can now buy a pre-shaped stock, and the flintlock, brass plates and trigger guard, for about $500, a machined barrel for about $200, and with many hours of work construct their own "poor boy." But most gun makers carve their own stocks from fine maple and other wood collected over the years, as David Price does in his New Hampshire shop.

For Price, the process is imbued with history and the satisfaction of what he calls "artistic expression," a blend of craft and creation resulting in stunning reminders of the past, like the double-barreled flintlock "swivel-breech" waiting on the rack to be picked up by its new owner, the silver inlay and maple stock burning in the afternoon sunlight. "People ask how I can part with them," he says, "but I know the rifle will always be mine. The buyer is just the curator."

Historical association, and the pleasures of developing an offbeat, thoroughly absorbing, demanding skill, also enticed Wallace Gusler into rifle making at the age of 14. Inspired by the televised exploits of Davy Crockett, Gusler went to Williamsburg, Virginia, in 1962 with nothing more than what he calls a "boot degree" from high school, and discovered that "they would pay me to do what I wanted to do." He eventually became a master gunsmith for the Colonial Williamsburg Foundation, and today his guns, made from scratch—including barrels and flintlocks—cost $20,000.

That may be a lot of money, but each rifle requires more than 400 hours of labor, or $50 an hour—about what an automobile repair shop charges for the services of its mechanics. In the process of learning museum-grade gun making, Gusler became something of an expert in colonial American history. Known today in the contemporary world of flintlock gun makers and aficionados as an unstoppable fount of 18th-century lore, placenames and battles, he points out that the longrifle was the only significant weapon made in America in colonial times and the first American product recognized in Europe for its quality.

Gusler says the first person to recognize the longrifle as a work of art was a Quaker from York, Pennsylvania, named Joe Kindig, Jr. His landmark 1960 book described a highly regional craft, with different styles for different communities, just as with furniture. Adds Gusler ruefully, "The longrifle is still in the basement of American art. People will spend hundreds of thousands of dollars on period furniture and then hang an old $250 rifle on the wall."

The failure of most historians and art museums to give the longrifle its proper due as an objet d'art is the concern of another gun maker and historian, John Bivins. Former director of publications at the Museum of Early Southern Decorative Arts in Winston-Salem, North Carolina, and current organizer of a retrospective exhibition of custom gun making for the Minneapolis Institute of Arts, Bivins argues that arms making "was at times considered the highest expression of art." Louis XIV, for instance, had court-appointed masters who were given living and working space in the Louvre, and were paid comparably to sculptors, says Bivins.

The curatorial responsibility David Price spoke of is reflected throughout this small, rapt world of longrifle makers and admirers. Flintlock rifles are often sold or traded, but they are also remembered in detail by those who simply look at and handle them. The knowledgeable eye notes a gun's profile and "architecture"—the way the gun builder works out structural problems inherent in the form and then artfully marries steel and carved, inlaid wood in a functioning whole. "The difference between a good gun and a great one," one gun builder told me, "is 1/32nd of an inch of wood here and there."

TERRY MCCREA, SI

The percussion ignition system replaced the flintlock by the 1830s. These two percussion longrifles from the Smithsonian's collections were used in a fatal 1838 duel between Congressmen.

The subtleties of the form are appreciated by Gordon Barlow, executive director of the Contemporary Longrifle Association (CLA), who told a noted gun maker, Judson Brennan, to produce the best rifle of which he was capable. Brennan lives outside the town of Delta Junction, in Alaska, with his wife and eight children.

He built everything for Barlow from scratch, except for the barrel. He used gold panned locally for the inlaying of gold-filled decoration into

metal parts, and located an old piece of maple for the stock that was the finest he had ever seen. At first, both gun maker and gun buyer assumed the longrifle would come in at around $15,000, and Brennan regularly called Barlow for payments to cover the running tab for parts and labor.

After three years, Brennan received a call from Barlow. "He said, 'Well, Judson, you've reached $50,000.'" Brennan remembers "swallowing hard" and agreeing to bring the project to a close. As soon as he finished the longrifle—it was now up to $55,000—he took it hunting. That longrifle later was placed on display by Barlow at the CLA's annual meeting in Cincinnati in 1999. Slim, highly ornate, it inspired something close to awe in those attending, while Brennan, an unassuming man in a tie-dyed T-shirt, beard and ponytail, who had driven all the way down from Alaska, sat at a nearby table, unnoticed by all but the cognoscenti of longrifles.

When I asked him about the intricacies of the custom-made lock, he got up from his table, lifted the $55,000 longrifle off the display rack, borrowed a screwdriver and promptly took it apart, demonstrating in the process the sense of entitlement he and others like him feel about their work, regardless of who happens to own it.

Smithsonian firearms expert Sarah Rittgers readies a flintlock for firing (left to right): Clean the touchhole between priming pan and bore. Measure charge to be poured into the barrel (followed by the bullet). Sprinkle powder into the priming pan. Opposite: When she pulls the trigger, sparks ignite the priming powder, the flame reaches the main charge via the touchhole and the rifle fires.

Another well-known gun builder, Frank House, brother of the equally renowned Hershel House, was asked to build a rifle for Mel Gibson's character in the movie *The Patriot*. Gibson stars as a fictional hero based in part on Francis Marion, who used guerrilla tactics against the British during the Revolution. Concerned with period authenticity, the movie's prop master contacted House, who had some knowledge of the backwoods exploits of the "Swamp Fox."

"We talked about it," House told me, of his consultation with the producers, "and decided that, although the character was a veteran of the French and Indian Wars, he probably wouldn't have kept the rifle he had used back then. The rich updated their weapons, so we decided on something fresh, something Southern. Because of the Tidewater region's trade relationship with Britain, there would be a British influence—so we made a rifle that was iron-mounted, the engraving done in an English style. The way the buttstock is shaped, and the use of rococo artwork, would suggest it was made in the James River basin style, which influenced builders as far south as South Carolina and Georgia."

House wouldn't say what he charged for the job, which took three months, only that he asked for a 50 percent down payment at the start. "When it was finished, I had to age it up. I took the rifle in and out of the air-conditioning, to let it sweat and fester, and polished it with steel wool." What he considers a dead ringer for a period longrifle used in the field is exactly what the producers were hoping for, unlike the exaggerated longrifle—all of six feet—that filmmakers tried to have made for Daniel Day-Lewis as Natty Bumppo in *The Last of the Mohicans*. They found that gun makers refused to make the too-long rifle, and settled for a historically accurate five-footer.

For *The Patriot*, House made a cheaper version of his rifle, to be filmed at a distance during stunts. His wife, Lally, made the porcupine-quill strap for Gibson's powder horn—two, in fact, so the actor would have a backup.

The film's production company, Centropolis Entertainment, also consulted with the Smithsonian's National Museum of American History on many aspects of the movie, from firearms to hairstyles to the design of light fixtures in a local tavern (SMITHSONIAN, July 2000). A documentary film, *HBO First Look: The Patriot*, which debuted in June, focused on the collaboration of the filmmakers and the museum's experts and their collections.

I asked House how it felt to know one's work would be

viewed by millions. "The glamour disappears after you've pushed a file for about eight hours," he said. In the final analysis, a gun maker is alone in his shop with metal, wood and more than 200 years of the accumulated past.

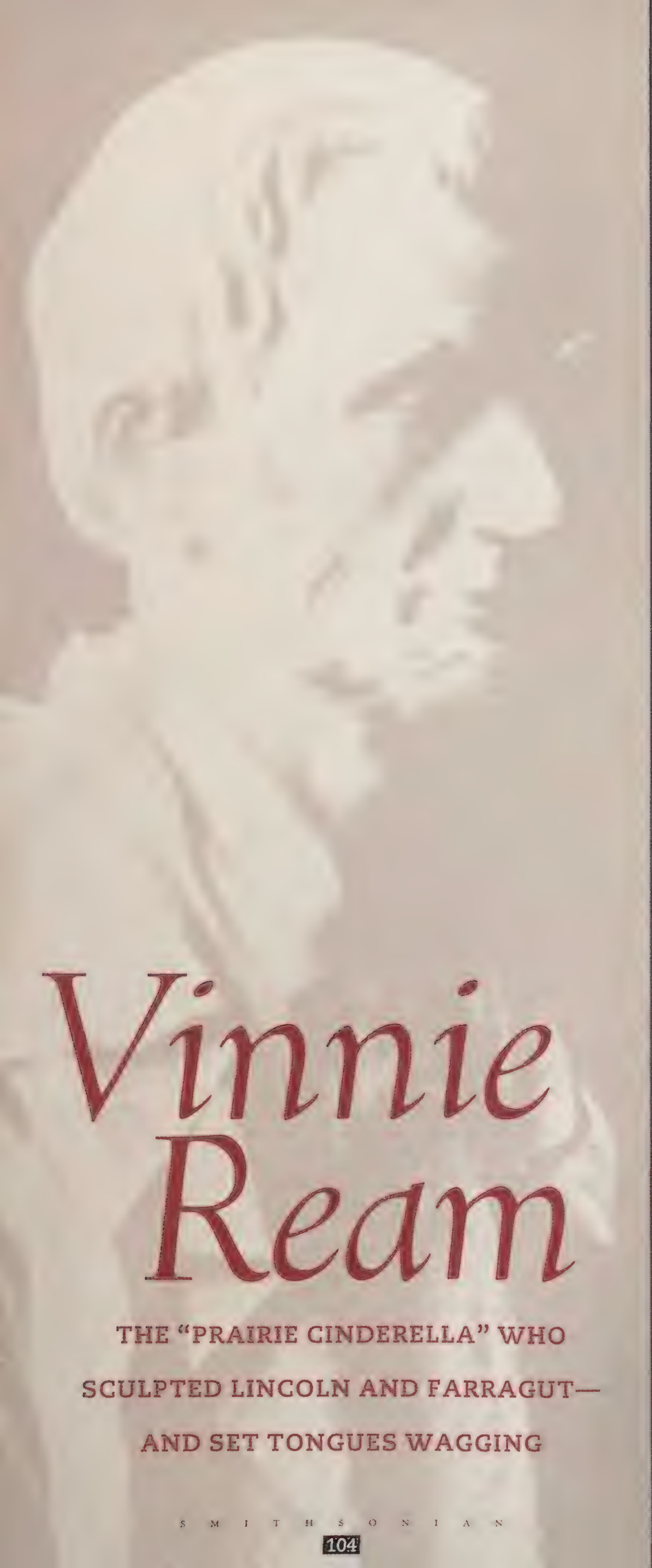
That past has reached into the present, to a gorgeous spot in the mountains of north-central West Virginia where I am visiting a rendezvous. Whether real or fantasy, it is certainly interesting. I can imagine this scene taking place in 1770, my fellow campers—all members of the Widowmakers, a club of competitive shooters of longrifles—trans-Appalachian pioneers sharing a meal and a smoke. They have gathered on the cusp of the 21st century, while strongly empathizing with the 18th.

The men, heavily bearded, wear handspun shirts and deerskin leggings they have made themselves. I have settled for five-button cloth trousers and moccasins loaned to me, but am most grateful for the horse blanket coat and for the absence of portable radios and squealing cell phones, the ubiquitous voices of modernity. Such "buck-skinning," the collective term for this replication of the ways of the earlier age, combines genuine interest in history, nostalgia for a simpler America, and the desire to drop out, if temporarily, of a culture in which individuality and craftsmanship are evanescent.

Arrayed on racks in front of our tents are the graceful silhouettes of contemporary longrifles. One of the men picks his up and wipes away the dew with a cloth. It was made by David Price, in New Hampshire, but in the firelight it is indistinguishable from a flintlock that might have emerged in colonial Pennsylvania or Virginia, in another time. Before stowing it, its owner risks being charged with sentimentality and says, "You know, this is a work of art."

He'll get no argument from me.

James Conaway wrote on the Dry Tortugas in November 1999. This is photographer Walter P. Calahan's first assignment for SMITHSONIAN.



Vinnie Ream

THE "PRAIRIE CINDERELLA" WHO SCULPTED LINCOLN AND FARRAGUT—AND SET TONGUES WAGGING

BY KATHRYN ALLAMONG JACOB

NO SOONER HAD CRUSTY CIVIL War hero Adm. David Farragut died in August 1870 than efforts to raise monuments to his memory sprang up. The war had ended only five years earlier, and Farragut's heroics remained fresh in everyone's mind. His distinguished career had culminated in the 1864 Battle of Mobile Bay, in Alabama, when he had shouted, "Damn the torpedoes! Full speed ahead!" which galvanized his fleet to sack a series of important Confederate forts. Farragut's stunning victory here and his earlier daring attack on the city of New Orleans led him to become America's first admiral.

Commemorating this naval hero was something Congress took seriously. A Congressional resolution called for a statue of Farragut "after a design moulded from life" to grace the nation's capital. Apparently, these words had been carefully chosen by friends of Washington, D.C.

sculptor Dr. Horatio Stone, who was already at work on a Farragut statue. Stone assumed he had the commission in the bag. He was wrong.

The introduction of the resolution proved to be just the first salvo in a ferociously fought campaign to win this prestigious prize. When the dust settled, Stone came out the loser, bested not by one of the old lions of American sculpture but by a striking young woman with sparkly brown eyes and a tangle of thick curly hair. While 26-year-old Vinnie Ream had only one major sculpture under the belt that encircled her tiny waist, she had an abundance of ambition and charm. To her supporters, she was just a simple girl from the Wisconsin wilderness, a "prairie Cinderella." To her detractors, she was a shameless flirt who used her feminine wiles to win commissions her mediocre talent didn't merit.

MS. REAM GOES TO WASHINGTON

VINNIE REAM WAS BORN IN MADISON, Wisconsin, in 1847. Her father, Robert Ream, a former surveyor, brought his family East to Washington, D.C. in the first year of the Civil War. Money was tight for the Reams. In 1862 Vinnie Ream appealed to political friends and secured, at the Post Office Department, a $500-a-year clerkship open to women. Although two months shy of her 15th birthday, the precocious girl swore that she was "above the age of 16 years" and went to work in the dead letter office.

In 1863 she visited the studio of sculptor Clark Mills, whose statue of Andrew Jackson astride a rearing horse stands opposite the White House. Of this transforming day, Ream later wrote, "I felt at once that I, too, could model and, taking the clay, in a few hours I produced a medallion of an Indian chief's head."

Ream nears completion of her ten-foot-tall plaster model of Union Civil War hero Adm. David Farragut at the Washington Navy Yard.

Impressed, Mills offered to take her on as a part-time pupil.

Mills' studio in the Capitol basement was a popular spot for politicians. Several Congressmen were intrigued by the novelty of Mills' beautiful apprentice and sat for her. Within a year, Ream was sculpting busts of such notables as Pennsylvania Representative Thaddeus Stevens and Oregon Senator James Nesmith.

In 1864 Ream expressed her wish to make a bust of President Lincoln. Two Congressmen interceded with the President, but Lincoln refused. When he learned that she was a young girl trying to earn a living by her art, he relented and allowed her to set up shop in a corner of his White House office, where she would

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work while he spoke to a succession of petitioners.

The resulting bust of Lincoln, lavishly praised by her supporters, emboldened Ream to seek the $10,000 commission for a full-length statue of the President offered by Congress early in 1866 not long after the assassination. Few commissions for sculpture had been awarded by the federal government, and none had gone to a woman, much less a girl of 19 years with little experience. Ream launched her effort with a demure letter to the U.S. House Committee on Public Buildings and Grounds. Others also set to work on her behalf. In April 1866 a remarkable petition arrived at the committee's offices. It began: "The undersigned . . . being personally acquainted with Miss Vinnie Ream, take great pleasure in endorsing her claims upon public patronage. . . . " President Andrew Johnson's name topped the list of signatures, which included those of members of his Cabinet, 31 senators, 110 current and former representatives, and 31 other notables, among them Gen. George Armstrong Custer.

A TALENT FOR LOBBYING

THADDEUS STEVENS' RESOLUTION awarding the commission to Ream passed the House by a vote of 67 to 7, but it ran into trouble in the Senate. Massachusetts Senator Charles Sumner was among those who had not fallen under Ream's spell. He wasted no time on subtlety: "I am bound to express my opinion that this candidate is not competent to produce the work which you propose to order. . . . She may make a statue, [but] she cannot make one that you will be justified in placing in this national Capitol. Promise is not performance, but what she has done thus far comes under the first head rather than the latter." He continued for some minutes more.

Even before Sumner finished, Ream's champions were on their feet

seeking recognition. Senator James Nesmith of Oregon got the floor first. Regarding her inexperience, Nesmith sarcastically pointed out that "the Senator might have raised the same objection to Mr. Lincoln, that he was not qualified for the Presidency because his reading had not been as extensive as that of the Senator, or because he had lived among rude and uncultivated society." Alluding to Sumner's admiration for all things European, Nesmith noted bitterly, "If this young lady and the works which she has produced had been brought to his notice by some near-sighted, frog-eating Frenchman, with a pair of green spectacles on his nose, the Senator would . . . vote her $50,000."

Senators entered the fray on both sides. Senator Jacob Howard of Michigan sided with Sumner. While questioning Ream's artistic talent, he conceded archly that "surely she has shown no lack of that peculiar talent known commonly as 'lobbying' in pressing forward her enterprise. . . . " But in the end, Ream's friends triumphed 23 to 9. The $10,000 commission for a full-length statue of President Abraham Lincoln was hers.

Marriage proposals started to arrive in Ream's mailbox, and stories about her popped up in newspapers all across the country. Some reporters

LIBRARY OF CONGRESS (2)

"A more distinguished company has seldom graced an American wedding," wrote one reporter in 1878 when Vinnie Ream (left) married Richard Leveridge Hoxie (inset), a lieutenant in the U.S. Army Corps of Engineers.

noted her beauty, "her tiny pink fingers and long raven lashes"; some her energy, calling her a "hummingbird of a maiden." That so important a commission should go to so young and inexperienced a sculptor also, however, sparked censure and incredulity, especially among women writers. Asking rhetorically "Who is Vinnie Ream?" the acid-penned reporter Jane Swisshelm answered, "Ream is a young girl of about twenty who has been studying her art for a few months, never made a statue, has some plaster busts on exhibition, including her own minus clothing to the waist, has a pretty face, [and] . . . sees members at their lodgings. . . . " Others hinted darkly that Ream was a "humbug" who did not do her own work.

She set to work in Clark Mills' old studio in the Capitol amid a steady stream of Congressmen, reporters and the curious, who were eager to see the young artist at work. In the spring of 1869, the finished model was packed up and shipped off to Italy to be rendered in marble. With it went Ream, her guitar, her two pet doves and her parents.

The marble statue of Abraham Lincoln—along with Ream and her parents—arrived back in Washington, D.C. late in 1870. At the statue's unveiling in January 1871, the audience broke into applause for the young artist as the American flag enveloping it was slowly raised (p. 113). The first reviews praised the statue to the skies. But in the weeks that followed,

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Ream spent five months in the White House modeling Lincoln in clay, later describing him as "a man of unfathomable sorrow," haunted by his son's death and civil war.

other voices, again those of women reporters, sang a different tune. They charged that the Lincoln statue was "a frightful abortion," "a formless thing," "lifeless and soulless." Most serious was the criticism of the grand old man among American sculptors, Hiram Powers, who called the statue a "caricature," and branded Ream a "female lobby member" with "no more talent for art than the carver of weeping willows on a tombstone."

Whether praised or pilloried, however, Ream was a celebrity. Picture postcards of her and her artwork were sold in the Capitol and on the street. She was also nearly the sole supporter of her family, and fame hadn't brought her wealth. Funds from the Lincoln commission had quickly disappeared. Nor had fame brought her new commissions or buyers for her allegorical statues. She needed business. When the Congressional resolution calling for a full-length Farragut statue was intro-

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duced, Vinnie Ream saw her chance.

Much to sculptor Horatio Stone's disappointment, the Joint Committee on Public Buildings and Grounds did not award him the commission but announced an open competition. Artists had nine months to submit their models. The winner would receive a $20,000 commission and the chance to sculpt one of Washington's most prestigious memorials.

THE COMPETITION

REAM WENT TO WORK IMMEDIATELY on both her model and her friends. She courted Farragut's widow, who became her champion. She asked Mrs. Farragut for the names of the admiral's friends, and she wrote to every one of them soliciting their support on her behalf.

By January 1873, a dozen male artists and Ream had submitted models. While most of the models were small, Ream's and Stone's were each larger than life. Members of the press found some purported likenesses bad beyond belief: J. Wilson MacDonald's model made Farragut look like he was throwing a rope to a trapeze performer; Randolph Rogers' looked like "martyrdom at the stake" and was "too dreadful to contemplate." The entry of Edward Watson included a tiny, featureless Farragut atop an enormous, ill-proportioned base, or "a good deal of pedestal and precious little Farragut." Both Stone's and Ream's models had their partisans. Several naval officers praised Stone's model as "true to life." President Ulysses Grant called Ream's model "first rate," and Adm. David Porter claimed hers was "the only likeness of the Admiral in the lot."

In Gen. William Tecumseh Sherman, Ream found her most ardent supporter. On Valentine's Day afternoon in 1873, the infamous Union general who devastated the South with his march to Georgia went to the Capitol to view the Farragut models and met the young sculptor.

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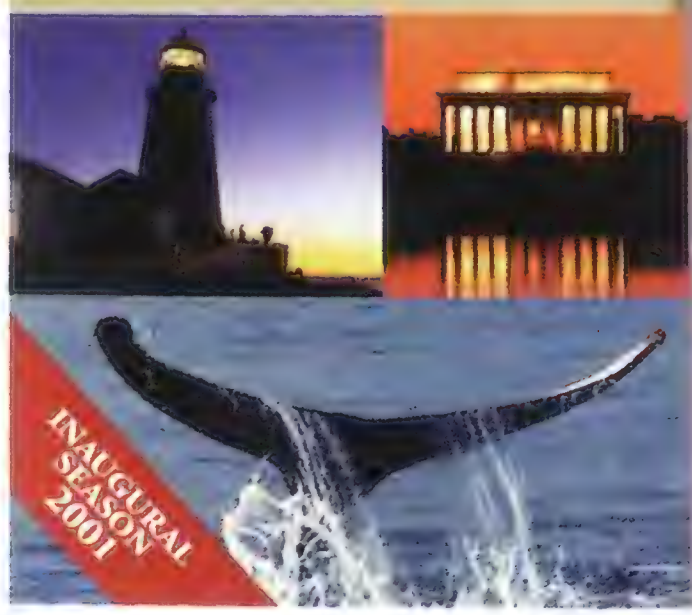

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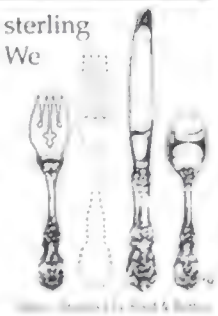

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She invited him to visit her studio. A few days later, Sherman wrote the committee that "the plaster model of Vinnie Ream struck me decidedly as the best likeness, and recalled the memory of the Admiral's face and figure more perfectly than any other model there on exhibition."

Much speculation has surrounded the relationship between the 53-year-old general and the 26-year-old artist. Sherman's letters to Ream suggest intimacy, yet they could also be just another example of the effusive and flirtatious language that was common to the 19th century. In April 1873, for example, Sherman writes, "I miss you more than I thought possible, and your little foolish ways. . . ." Later he admonished Ream, "I destroy your letters. You must do the same of mine." But she didn't. Among her papers at the Library of Congress is Sherman's letter in which he asks, "I . . . wonder if you miss me and who now has the privilege of toying with your long tresses and comforting your imaginary distresses." What is clear is that Sherman, like many other prominent men in Washington, was smitten by Vinnie Ream and that the two began to plot a strategy designed to win her the Admiral Farragut commission.

By then the committee had begun deliberating. Days, then weeks, passed with no decision. Growing increasingly anxious, Ream urged Sherman to lobby two senators on the committee, Justin Morrill of Vermont and Simon Cameron of Pennsylvania. Sherman replied that it "would hardly be right for me to seek out Mr. Cameron and urge him to any definite course of action; but if I see him I will endeavor to do so in such a way as to make him feel that it is his own thought."

Despite Sherman's efforts, Ream came up short when the committee voted in February 1873. The committee decided to reject all models and take the matter up in the next Congress. The *New York Times* observed, "The nation ought to feel particularly gratified when it reflects upon its narrow escape from another of Miss Ream's eccentricities in bronze." Ream, who needed this commission to make ends meet, grew frantic.

Ream's bronze of Admiral Farragut stands vigil in Washington D.C.'s Farragut Square.

In February 1874 Congress took up the matter of the Farragut statue again. A proposal emerged that shifted responsibility for the decision onto the shoulders of Secretary of the Navy George Robeson. With no influence over Robeson, Ream begged her friends to help her. Representative Godlove Orth of Indiana wrote that "her friends in the House" would add the names of General Sherman and

REGIS LEFEBURE (2)

The marble statue of Lincoln, which Ream began at age 19, stands in the U.S. Capitol.

Mrs. Farragut to the proposal along with that of Robeson. Stone's supporters cried foul, but the resolution passed anyway.

Robeson resented the setup. He refused to poll the two other members of his committee. Ream again worked behind the scenes. When asked to weigh in on her behalf, Senator John Ingalls of Kansas teasingly replied that she was "the biggest and most delightful fraud I ever met," but he agreed to do what he could. Eventually Robeson had no choice but to take a vote of his committee. General Sherman and Mrs. Farragut voted for Ream: Robeson chose latecomer Launt Thompson. Unable to change Mrs. Farragut's mind, Robeson relented and announced Ream the winner.

With the first installment of the $20,000 in hand, she set to work. By the spring of 1878, her ten-foot-high plaster model depicting Admiral Farragut during his bold night attack in 1862 of the forts protecting New Orleans was finished. Most large bronze sculptures were sent to Europe for casting, but in the summer of 1879, Ream announced that the Farragut statue would be cast at the Washington Navy Yard, a first for the foundry there. In addition, the statue and four mortars adorning the pedestal would be made from the bronze propeller of the admiral's flagship, the *U.S.S. Hartford*.

The *Evening Star* wrote that "patriotic impulse prompts her [Vinnie] . . . to have the work done in this country." But love as much as patriotism lay behind her choice. On May 28, 1878, after turning down more than a dozen suitors, Vinnie Ream married handsome Lieut. Richard Hoxie, who was assigned to Washington with the Corps of Engineers. General Sherman himself gave the bride away.

The Farragut statue was dedicated on April 25, 1881, the anniversary of the day that New Orleans surrendered. Ream joined President and Mrs. Garfield and Mrs. Farragut in places of honor on the stage as John Philip Sousa conducted the Marine Band. Deafening cheers rose as two members of Farragut's crew hoisted the flag covering the statue. Vinnie Ream Hoxie rose to acknowledge the crowd's applause.

After her marriage, Ream deferred to her husband's wishes and gave up sculpting. According to Ream family lore, Hoxie took her hands in his and said, "These now belong to me. Your work for art is ended. . . . Now you must live, not for the world, but for love and me." She settled into the role of good Victorian wife and devoted herself to volunteer work, her hus-

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band, and her son, Richard. The Hoxie home on Farragut Square became one of the capital's liveliest salons, offering good music and an interesting assortment of Congressmen, Cabinet members, military men and other luminaries.

In 1906 Vinnie Ream Hoxie came out of retirement to sculpt Iowa Civil War governor Samuel Kirkwood for Statuary Hall in the Capitol. Writing to a friend, she explained her husband's change of heart: "Three years ago I had a most serious attack of heart trouble and the army surgeons thought it was due to suppression of feeling—my wanting to work and not being allowed to do so. Col. Hoxie became very much frightened . . . he told me again and again that if I would try and live I might resume my work." Although seriously ill, she managed to complete the Kirkwood statue by means of a rope hoist and boatswain's chair rigged up for her by her husband.

In 1912 the State of Oklahoma asked her to sculpt a statue of Sequoyah, the Cherokee leader, for Statuary Hall. The model was nearly finished when she collapsed while on a visit to Iowa City. Rushed back to Washington in a special railcar, she died in the capi-

Rumors flew about the relationship between Ream and General Sherman.

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This bas-relief portrait of Ream adorns her monument at Arlington National Cemetery.

tal, of kidney disease, at 67 years of age on November 20, 1914.

The Sequoyah statue was finished by her friend and sculptor George Zolnay. Her husband, now a general, also commissioned Zolnay to sculpt a bronze bas-relief of his wife as a young girl to grace the front of her graveside monument at Arlington National Cemetery. To crown the memorial, General Hoxie had a bronze casting made of Vinnie Ream Hoxie's "Sappho," a neoclassical rendition of the great woman lyric poet of ancient Greece. It was one of her favorite pieces. He gave his wife's original marble statue of Sappho to the Smithsonian Institution where it now is in the collection of the Smithsonian American Art Museum.

Lastly, he wrote this fitting epitaph for this remarkable woman: "Vinnie Ream—Words that Would Praise Thee are Impotent."

Kathryn Allamong Jacob is curator of manuscripts at Schlesinger Library at the Radcliffe Institute of Harvard University.

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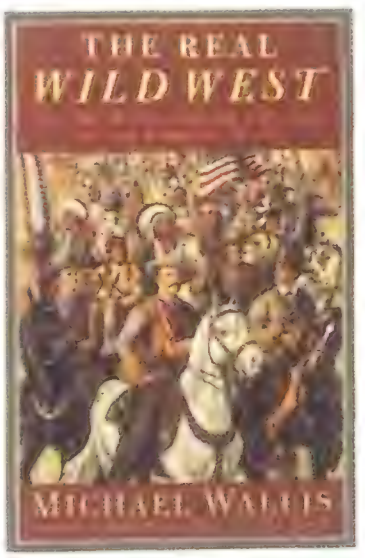
The Real Wild West:
The 101 Ranch and the Creation of the American West

Michael Wallis, St. Martin's Press, $35
Griffin, $21.95 (paper)

JUST BEFORE CHRISTMAS IN 1911, A hundred Indians pitched their tepees on the pier in Venice, California. Though far from their Oklahoma prairie lands, the Ponca tribe seemed right at home at the Pacific's edge, for in a nearby encampment was a host of cowboys, cowgirls, horses and buffalo. "The Real Wild West"—the legendary touring show that captivated audiences across the country—had circled its covered wagons within striking distance of Hollywood.



By then the actual Wild West was just a memory, but three brothers who had grown up riding the range were determined to turn the memory into legend. That winter, Joe, Zack and George Miller signed a contract with the New York Motion Picture Company. Under the agreement, the Millers' 101 Ranch Show lent the filmmakers 75 cowboys, 25 cowgirls, 35 Indians, assorted livestock and covered wagons. Soon, while cameras captured the action, cowboys and Indians blazed new trails through the sagebrush canyons of Southern California. The West was being won all over again, on-screen. Meanwhile, back at the ranch . . .

From chronicles of Buffalo Bill's Wild West Show to biographies of such figures as John Wayne and John Ford, historians have documented the transformation of the West into a form of entertainment. But now a forgotten force in Western mythmaking has its day in the sun. Michael Wallis' *The Real Wild West* succeeds in building a bridge between the factual West and the fabled one. With ample detail and a wild cast of characters, Wallis spins the saga of a single ranch where the West was turned first into a road show and later into some of the first filmed Westerns.

Before the Millers took their show on the road, there was a real 101 Ranch. It was, Wallis writes, "the wildest, woolliest, and most unusual operation of its kind in the history of the American West." Established in 1893, the 101 Ranch encompassed 110,000 acres lying three hours due north of Oklahoma City. Until the cattle business waned, the ranch hosted regular roundups. Later it was the site of wildcat oil drilling and of the extravagant Wild West shows, drawing more than 65,000 spectators at a time. Geronimo paraded there, wearing a top hat and riding in a convertible. Theodore Roosevelt, John D. Rockefeller and other bigwigs numbered among the guests, while the ranch also served as home to a ragtag assortment of Westerners, including Ponca Indians, cowboys, female sharpshooters and a good number of future celebrities, including movie star Tom Mix and humorist Will Rogers.

The 101 Ranch was started by the Millers' father, George Washington Miller lived the life his sons could only dream of. Inspired by stories of Daniel Boone, Miller took his pregnant wife and two young children out of Kentucky and across the

prairie in 1870. Bound for California, Miller instead got sidetracked into business. Ruthless, bigoted and salty as salt pork, he first raised hogs in Missouri, then began taking hog meat and cattle down the Chisholm Trail into Texas.

Many writers have romanced the West, but Wallis, author of nine other Western histories, is too wise a chronicler for that. *The Real Wild West*, to be sure, contains generous helpings of Western lore. Every other chapter is a short portrait of a Western character. These sketches include both the famous (trailblazer Jesse Chisholm and gunslinger Wild Bill Hickock) and the little known (Ponca chief Standing Bear and rodeo star Bill Pickett). But Wallis most certainly comes to bury myth, not to praise it. Drawing on memoirs and diaries, he debunks the surreal West that came to be depicted in those films the Millers would influence.

THE SETS BEHIND THE LEGENDS

Wallis' tale gathers force once the three Miller sons take center stage. Then the author's encyclopedic knowledge of the 101 Ranch and Western lore converge. As the Millers transmute history into showbiz, Wallis weaves firsthand accounts with the riveting saga of their rootin' tootin' shows, holding all those Western films lying at the heart of American popular culture up to the glaring spotlight of truth.

No amount of truth will ever deflate the Old West. Its fables are too integral to the American self-image to be gunned down by the introduction of mere facts. But *The Real Wild West* will help Western fans see the stage sets behind the legends and the seams in the cowboys' costumes: the book fills the empty canyon that lies as a chasm between film and Western history. ⧗

Bruce Watson, who writes frequently for Smithsonian, is a freelancer who is based in western Massachusetts.

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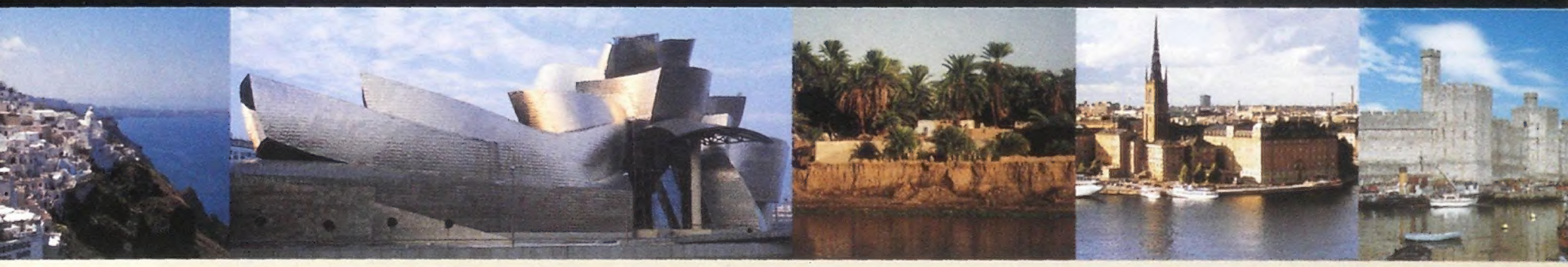

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THE LAST PAGE

Signs of the Times

BY ROBB WHITE

TRAVELING FOR A LONG DISTANCE on the same road over and over again brings out a peculiar keenness of eye in the observer. I used to have to drive back and forth 400 miles to New Orleans every 30 days with some other men who were on my tugboat crew. We were immune to the great spectacle of the woods in that part of the country. What was much more interesting to us were the signs along the highway advertising the little businesses that sprang up and went broke. Signs like "Firework Two Mile" and "Balled Peanus, Hams, Bacon."

After the initial babble of discussion when that last sign appeared, we established a ritual that only one of us could make a single comment on it each trip. "What kind of bacon?" "Reckon they ball them up all at once or one at a time?" "Suppose they are shelled out or still got the hull on?" The ritual continued long after the business had closed and kudzu covered the sign.

When my sisters and I were little, we used to ride in a pickup truck with our mother a hundred miles to the coast every chance we got. We children always rode in the back. There was a Burma Shave series in this one little field: "Dinah doesn't," on the first sign, then "Treat Him Right" and "But If He'd Shave," on the second and third, and finally, "Dinah might." We, in our juvenile ecstasy, thought that was the wittiest thing anybody could have ever put on some little signs, and we always stood up to read the whole thing as loud as we could.

Once when we were shouting the message into the 35-mile-per-hour wind coming over the cab of the truck, my big sister got hit in the mouth by a yellow jacket that stung her on the back of her tongue. By the time we got to Sopchoppy, her tongue was so swollen that she couldn't get it all back in her mouth, and Momma had to let her ride in front so people wouldn't stare at her so. After that, we memorized the signs with our mouths shut and ducked back down in the truckbed to do our hollering.

Now, my wife and I drive that same hundred miles to the same coast for the same reason. The Burma Shave field is planted in pines and the whole world is different. But in one respect it hasn't changed all that much. There's a woman who lives just beyond the field where we hollered into the wind, and when we go past her place, it's as if our whole lives are flashing by (at 60 mph, not 35 like back then). This old woman has always decorated her yard according to the seasons, but she never takes in any of her decorations when the seasons are over. There's one thing nobody could ever recognize except keen observers with years of experience. It looks like an aluminum-foil-covered plywood comma on a stick growing from an enormous fire-ant bed. Beside that is what used to be an orange plastic bag full of leaves and grass clippings with a pumpkin face to celebrate some long-gone Halloween but now has squatted and erupted so that it looks like the Wicked Witch right after Dorothy threw the water.

Behind that is a small field of varicolored Easter crosses, some flat where they rotted off at the ground and some no longer crossed where they deteriorated at the duct tape. A plastic Santa tilts crazily among them, a dirt dauber nest stuck under his nose. Valentine's hearts droop and sag. American flags flap in a sequence of shreds from all the fence posts on the place. Veterans Day, Memorial Day, Fourth of July . . . which one? Which year?

"What in the world," you might ask, "is that aluminum-foil-covered plywood comma on a stick thing?" Why, Halley's Comet, of course.

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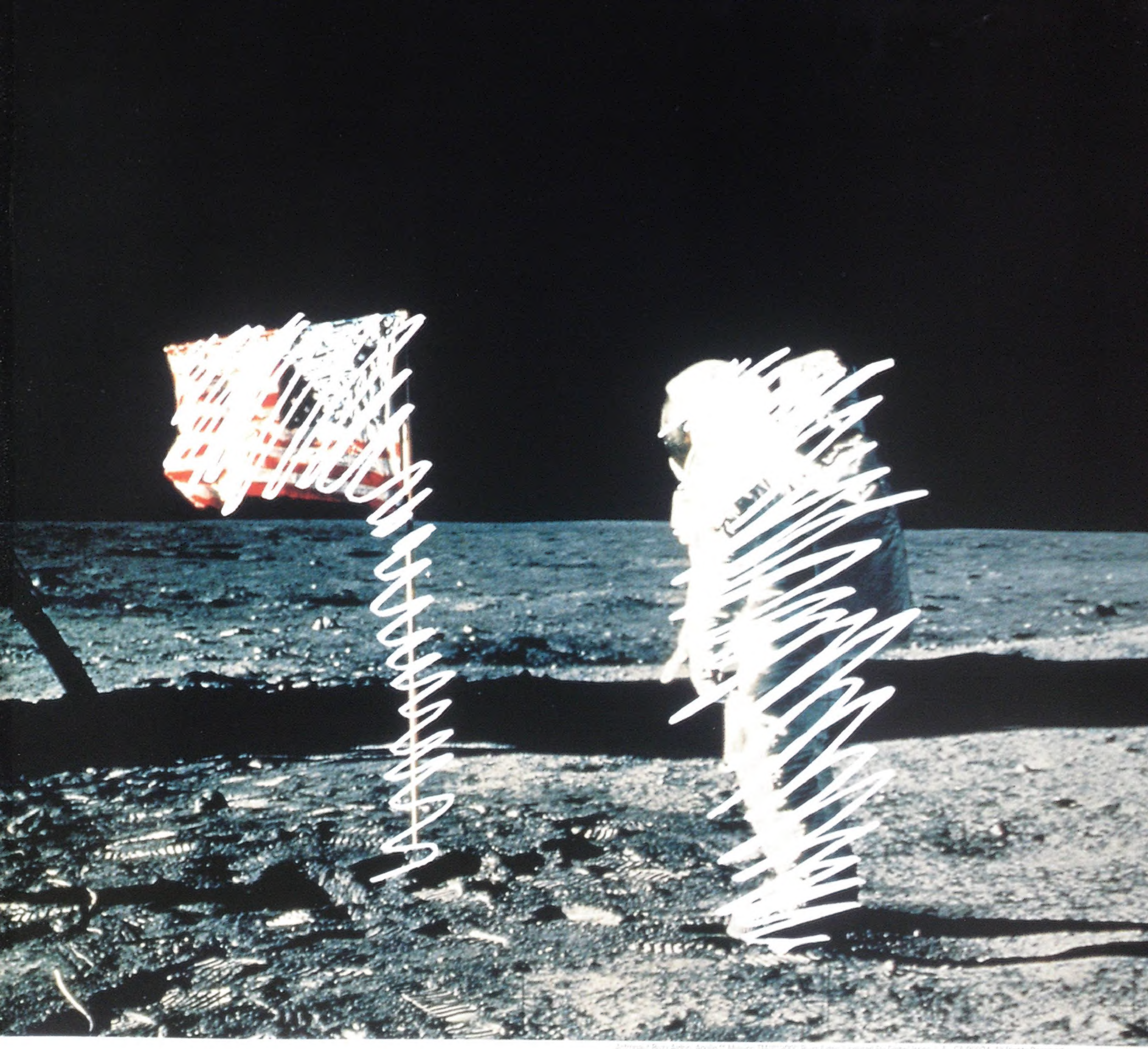

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